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NESTING OF THE WOOD DUCK IN CALIFORNIA

(WITH 26 PHOTOGRAPHS)

By JOSEPH DIXON

(Contribution from the Museum of Vertebrate Zoology of the University of California)

IN STUDYING the habits of the Golden Beaver in the San Joaquin and Sacramento valleys, the writer has had during the past four years an unusual opportunity to study also the habits and breeding of the Wood Duck (*Aix sponsa*), which, interestingly enough, proved to be a common resident duck there. Much conflicting information has been published regarding the breeding of this duck, and the writer decided to take pains to obtain some first-hand facts regarding certain points in question. Consequently special effort was made to locate nests; and, fortune favoring, the author has been able to study and to keep record of seven nests during a single breeding season. By taking water, food, note-book, binoculars, camera and sleeping bag, the observer was able to remain for days at the nest trees. In three instances the departure of the young ducks from nests in the trees was witnessed and actual photographs of this interesting incident were secured. By remaining in hiding within twelve feet of a nest, the observer was able to study and to photograph the female as she entered and left her home. All observations and photographs here presented are of individuals living entirely under natural conditions, *in the wild*.

The relation between the Wood Duck and the Golden Beaver is much closer than casual observation would indicate. The beavers, by building dams, form shallow ponds along many old river channels and sloughs. As these dams are raised by the beavers the depth of the water in the resulting ponds increases so that much brush and certain kinds of trees are killed by being drowned out. Thus, ponds (see fig. 12) choked in places with brush and trees that have been killed or gnawed down by the beavers, provide ideal living quarters and cover for such species of birds as the Wood Duck. These ponds, made possible by the beaver, soon disappear when the beavers are removed. As evidence of this interrelation the author, on November 1, 1921, counted 51 Wood Ducks on one secluded beaver pond less than five acres in extent. At that time 65 additional Wood Ducks were counted in another beaver pond some three miles distant. A third beaver pond brought the total up to 150. Investigation showed that 75 per cent of the Wood Ducks which winter in a region covering fifteen square miles of river bottom were concentrated in these three beaver ponds, the total area of which was not in excess of twenty acres. However, one should not make the mistake of thinking that Wood Ducks are abundant throughout California because 51 individuals have been counted in one pond and 65 in another. It must be borne in mind that this represents an unusual concentration of the birds, as will presently be shown.

In addition to providing suitable shelter, the beaver ponds make possible the growth of cattail, tule, California waterweed, and a minute, white-blossomed, aquatic plant, the water buttercup, which provide vegetable and insect food much relished by the ducks. Another attractive article of food, which becomes available in October and November, is found in the large, elongated acorns of the Valley Oak, which species of oak grows in dense groves in the vicinity of beaver ponds. These acorns (see fig. 15) sometimes attain a length of two and a quarter inches, while the shorter, stubby ones sometimes have a diameter of three-quarters of an inch. Though seemingly much too large to be swallowed by a Wood Duck, these acorns are nevertheless eaten in quantities. The abundance of acorns would account in large measure for the concentration of Wood Ducks which was noted in November.

In the region under discussion, near the confluence of the San Joaquin and Merced rivers, wood ducks begin to arrive in force in October. The number increases through November and December, reaching its maximum in January. By the middle of February the Wood Ducks begin to scatter out and, by March 15, only fifteen individuals were to be counted in one pond, and this, on May 2, contained but a single pair. In the beaver pond where 51 wood ducks had been counted on November 1, 1921, not one could be found the second day of the following May. At this latter date only one pair could be found in an adjacent beaver pond which had been thronged with Wood Ducks the previous fall. It is believed that in 1922 not more than five or six pairs remained to breed in the region where at least 150 Wood Ducks were present during the winter preceding. In 1923 the birds which bred locally had increased so that seven nests were found in the same territory hunted over the previous year. Six of the seven nests were found in an area one square mile in extent. According to the testimony of reliable men who have been born and reared in that locality, the number of Wood Ducks which remain through the summer has always been few compared with the number found there in winter. It is obvious that many of the Wood Ducks which winter in this locality are migrants from elsewhere and not local birds which have been raised there. Investigation by the writer has shown that at present the Wood Duck is increasing in numbers in California.

As the nesting season approaches, the Wood Ducks which remain in the region not only scatter out but, in many cases, seek nest sites close to human habitations. Individuals that have reared broods under man's protection, often unwittingly given, appear to appreciate the value of "sanctuary" and return to the same nest, year after year. This feature has been noted by various writers and is of too regular occurrence to be merely accidental.

As evidence that Wood Ducks actually prefer human association during the nesting period, the writer points to the fact that out of 12 nests found during two seasons, 10 were near inhabited farm houses or beside well-traveled roads. It has been suggested that this might be due to the fact that the Wood Ducks which nest about farm houses would be the ones most in evidence and hence most easily found, whereas those that nest in swamps and river bottoms would escape detection. However, in the present instance extended search in the swamps failed to reveal the presence of either Wood Ducks or their nests *during the breeding season*, and this in spite of the fact that search was made in places where the birds were common during the winter time.

In the writer's estimation the factors which operate to influence the Wood Ducks to nest near human habitations are: protection from natural enemies and the presence of suitable nest sites. In one instance a raccoon was actually seen by a ranchman,

FIG. 12. BEAVER PONDS FULL OF DEAD AND
FALLEN TREES ARE THE CHOSEN HAUNTS OF
THE WOOD DUCK.

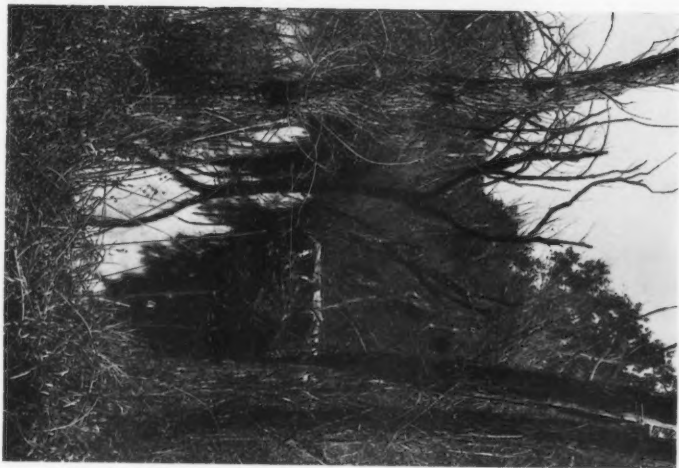


FIG. 13. IN MAY, 1923, FOUR NESTS OF THE
WOOD DUCK, ALL CONTAINING EGGS, WERE
FOUND IN A DISTANCE OF 100 YARDS IN THIS
ROW OF OLD GNARLED WILLOWS.





Fig. 14. THE TWO CENTRAL DEAD WILLOWS EACH CONTAINED A WOOD DUCK'S NEST. THE TWO NESTS WERE NOT OVER 30 FEET APART.



Fig. 15. ACORNS OF THE VALLEY OAK (NATURAL SIZE). IN SPITE OF THEIR LARGE SIZE THESE ACORNS ARE SWALLOWED IN QUANTITY BY WOOD DUCKS.

at daybreak, to climb up to a Wood Duck's nest where it frightened the brooding female from her nest and destroyed part of the clutch of eggs, thereby causing the Wood Duck to abandon her nest. In protecting his chickens from predatory animals, the rancher at the same time protects Wood Ducks which nest nearby. Ducks which nest near farm houses are thus less liable to suffer from depredations of four-footed enemies than those that nest out in the river bottoms where coons, cats, and skunks are numerous.

It is probable that Wood Ducks nest along fence rows beside roads because of the fact that in the old willow trees, which were originally fence posts, there are numerous natural cavities suitable for nest sites. In one row of old willow trees four nests of the Wood Duck, all containing eggs, were found May 30, 1923, in a distance of 100 yards. (See fig. 13.) In this case two dead willows standing within 30 feet of each other each contained a nest with eggs. (See fig. 14.) The cavities in road-side trees are in most instances so large that the duck can easily escape in case of attack, whereas if the opening be small there is much greater danger of the brooding female being captured on the nest by a coon even if the nest is placed well up in the tree.

There is good reason to believe that the period of incubation is the time of greatest danger to the Wood Duck as a species. For a period of from 30 to 33 days the female together with her eggs or downy young, the sole means of perpetuating the race, are confined day and night in a narrow cavity. Escape for the mother is possible only through the one entrance to the nest, which is often so small that the duck is able to squeeze through only with difficulty. At such times, when the female is brooding, the author has found by a study of muddy footprints that coons (fig. 16) habitually climb many of the larger trees, one after another, and investigate the larger cavities. It is obvious from tracks that the coon locates the duck on the nest by the sense of smell. In fact the brooding duck is out of sight entirely in most instances. Under such nesting conditions the "obliterative coloration" of the female duck could scarcely serve as a protection from enemies as suggested by Gerald Thayer in his book on concealing coloration (1909, p. 71). It would seem that the color of the bird on the nest, especially in a dark cavity, as in the above case, would be of little importance from a concealing standpoint.

It has been repeatedly demonstrated by the author that a slight scratching on the bark at the base of the nest tree, as of some clawed animal climbing, during the day and especially during the night, will cause the brooding female Wood Duck to leave the nest in haste. With one female it was found that if one or more persons spoke or whistled as they approached close to the nest the brooding bird would fly directly away from the nest when flushed. However, if the same person sneaked up quietly to the tree and scratched on the bark the female would drop from the nest directly down into a pool of water beneath the tree and there splash and flop about, dragging a make-believe broken wing and otherwise making every effort to divert the attention of the (supposed by her?) predatory animal. This ability of the female to distinguish between the sound of the human voice and the scratching, as of a climbing animal, was tested repeatedly by various people and the reactions of the duck were always as above noted.

Investigation has shown that in parts of California, irrigation ditches are commonly constructed beside roadways and along property lines. Thus, roadside trees are often near artificial waterways. Out of 12 Wood Duck nests examined, 10 were

directly over water. This is an advantage in that when the ducklings scramble out of their nest they flutter directly down into the water where they are able to take care of themselves, and so are relatively safe.

Out of 12 nests, 9 were in willows, 2 were in cottonwoods, and one was in a valley oak (see fig. 17). In the locality explored, willows are, of all trees, the ones most frequently found growing in or overhanging the water, and since the larger willows have many natural cavities they are the trees most frequently chosen. Ten of the nests found were less than 15 feet above the water. The extreme heights of 12 nests were 6 and 30 feet, respectively. Seven of the 12 nests were from 6 to 12 feet above the ground or water.

Of 12 nests, 9 were in natural (that is, rotted out) cavities and 3 were in old flicker holes (see fig. 18) that had been more or less enlarged by the decay of the wood. The greatest depth of any nest cavity from the entrance was 30 inches, the least was one inch, and the average was 15 inches. For height of nest above ground, size of entrance to nest, and dimensions of nest cavity the reader may consult the accompanying table.

DIMENSIONS OF NEST CAVITIES USED BY WOOD DUCKS

Nest	Height, in feet, of nest from ground	Size of nest cavity, in inches			Size of entrance in inches	
		Length	Breadth	Depth	Width	Height
1	7	18	6	18	6	10
1a	15	7	7	20	3¼	3½
2	9	8	10	12	3¼	6
3	8	14	10	8	3½	8
4	12	10	9	10	6	10
5	6	6	5	16	4	5
6	10	6	5	10	3½	4
7	8	12	10	30	8	10

Where old flicker holes were used for nests by Wood Ducks it was found that in each case the original entrance had been enlarged by the wood rotting away. I do not believe that a Wood Duck could squeeze through a flicker hole of ordinary size. Three and one-eighth inches is the width of the smallest opening I have seen a Wood Duck enter, and in this case the opening was vertically long though narrow. In one instance where the entrance to the nest was small as well as rough and irregular in outline, the female duck in squeezing through the opening had cracked the shell of one egg while it was still in the oviduct. The cracks were glossed or sealed over by the time the egg was laid, and the accidental cracking of the shell had not impaired the fertility of the egg which contained a well developed embryo. Major Allan Brooks tells me that he has found eggs of the Buffle-head in British Columbia that had likewise been cracked by the females squeezing through a small nest entrance.

During the latter part of March and the first part of April mated pairs of Wood Ducks were frequently seen to alight in tall cottonwoods near a certain farm house. They were also noted to be particularly interested in certain old gnarled willow trees. Both male and female ducks were observed to fly into the trees and the male duck was observed to enter several cavities while the female sat on a nearby limb and looked on. Although the drake led in the search for a suitable nest site, the final choice was always made by the duck. A certain amount of prospecting for a suitable nest site was indulged in apparently as a part of the regular courtship, the drake being most attentive to his mate at that time. Even where the same cavity served as a nest season after season, the drake always spent considerable time in investigating other hollow trees nearby. It is possible that the drake was a new mate each

Fig. 16. THE RACCOON IS THE MOST INVETERATE "COLLECTOR" OF WOOD DUCK'S EGGS KNOWN. MUDDY FOOTPRINTS AND OCCASIONAL HAIRS ON THE ROUGH BARK SHOW THAT COONS REGULARLY EXPLORE THE LARGER CAVITIES IN WILLOWS.



Fig. 17. OUT OF 12 NESTS ONLY ONE WAS IN AN OAK. THIS NEST WAS IN PLAIN SIGHT ON A WELL-TRAVELED ROAD. IT WAS 6 FEET ABOVE THE GROUND AND 60 YARDS FROM THE NEAREST WATER.



season and that he did not know the location of the old nest, as did the female, or it may have been mere nest time propaganda on the part of the male.

In one instance a certain hollow willow (see fig. 19) has been occupied by a pair of Wood Ducks for seven consecutive seasons. While definite proof is lacking, certain characters, such as the unusual tameness of the female, lead one to believe that the same duck used this nest during all these years. Whether she mated with the same male each year is an open question. Since the drake does not assist in incubation, being in fact never seen to enter the nest cavity after the first egg is laid, it is very difficult to establish the fact that he is or is not the mate of the duck that laid the eggs.

In four instances where I have had opportunity to keep a close watch, the drake did not forsake his brooding mate although casual observation would lead one to believe that he did. In known instances, the drake retired each morning to a chosen pond rimmed with a dense growth of green water weeds and shadowed by clumps of willows. Here he remained hidden in the shade during mid-day, being apprised of the approach of any intruder by the warning cries of numerous Brewer Blackbirds that nested and perched in the willows (see fig. 37). Late in the evening and sometimes early in the morning the drake was seen feeding or flying about with his mate, or perching in the nest tree. When the duck was frightened from her nest she was often seen to fly directly to the pond where the drake was in hiding; and in a few minutes both birds would return to the nest, the female always leading. I have thus seen the female go off and return with her mate many times. It was obvious that she knew where he could be found in time of need and that the marital tie was not yet completely severed.

Regarding the so-called concealing coloration of the Wood Duck, it has been my experience that this bird escapes notice primarily by keeping quiet and selecting shaded perches under or amid dead limbs or brush (see fig. 20). This preference for keeping in the shadows was well shown by one female which perched regularly on a certain limb in the morning when this perch was in the shade; while during several days' watch this bird never used the same perch in the afternoon when the sun shone on it. A certain drake and his mate were noted many times in a shaded pond under a clump of dense willows (see fig. 21). This was their favorite feeding and loafing ground. When the female was on the nest, the male could be found in hiding under the willows at almost any hour of the day. Even after the male had acquired the eclipse plumage he still remained in hiding in this same pond, where on various occasions I flushed the female and her brood of growing ducklings.

If the brilliant colors of the male match the brilliant yellow and green "water pictures" of his summer surroundings, as Thayer would have us believe (plate IV of his *Concealing Coloration*), why does the drake assume the dull-colored eclipse plumage at the very time when such aquatic vegetation is most brilliant? Conversely, the male is in his most brilliant plumage during the fall and winter, when the water-lilies are gone and the Wood Ducks' surroundings are dulldest colored!

I have never seen the drake present when the ducklings left the nest. On one occasion, about 12 hours before the young departed, the female deliberately left the nest and returned in 10 minutes with her mate. This drake followed the female about and even tried to alight within 6 feet of the nest. He then flew away and was not in sight when the young finally left the nest.

At 5 o'clock on the morning of June 22, 1923, I was sitting in a blind 12 feet from the entrance to a Wood Duck's nest, waiting for the young to come off. I had just looked into the nest and had seen the female brooding, while several

Fig. 18. A TYPICAL NEST IN AN ENLARGED FLICKER HOLE. OUT OF 12 NESTS 9 WERE IN NATURAL CAVITIES, AND 3 WERE IN OLD FLICKER HOLES.



Fig. 19. THE WILLOW IN THE LEFT FOREGROUND HAS SERVED AS A NEST SITE FOR A PAIR OF WOOD DUCKS FOR 7 CONSECUTIVE SEASONS.





Fig. 20. WOOD DUCKS OF BOTH SEXES HABITUALLY PERCH IN THE SHADOWS, WHERE THEY ESCAPE NOTICE BY REMAINING MOTIONLESS.



Fig. 21. THIS POND, WITH ITS DENSE WILLOWS AND PATCHES OF WHITE WATER BUTTERCUPS, WAS THE HIDING PLACE OF THE MALE EVEN AFTER HE HAD ACQUIRED THE ECLIPSE PLUMAGE.

ducklings played around her and one sat on her back. Barely had I returned to the blind when the drake flew in and perched on a dead limb 25 feet above my head. After peering intently at the nest entrance for 3 or 4 minutes he gave the "nest call" several times. Aside from being a little louder and harsher, this call was identical with the "nest call" of the female. Receiving no response, the male then flew to, and perched flicker-like at, the entrance. He then cautiously peered into the nest and then, catching sight of the camera in the blind, flew away before I could release the shutter. Although the drake returned, flew about the nest tree, and even perched in a tree nearby, he was not in the vicinity when the ducklings left the nest and took to the water.

Regarding the eclipse plumage of the male, it was found that in general this dull-colored coat was acquired about the time that the young Wood Ducks left the nest. The last drake seen in full nuptial plumage was noted June 1, 1923. On June 21, I again visited the nest site where this male had been seen, and at 5:30 in the morning found the drake, the duck, and the full number of ducklings busily feeding in a thick mass of water weeds near the center of a favorite pond about 200 yards distant from the nest tree. On that date, the male was well into the eclipse plumage, at least as regards body feathers. It was difficult, when the ducks were feeding, to distinguish him from his mate at a distance of 50 yards. One probable reason that Wood Ducks in the eclipse plumage are so rarely reported is due to the fact that under ordinary conditions in the field the average person would easily mistake the male for a female. In other words, from the last of June until about the first of September all the adult Wood Ducks appear to be females. The male which was seen to alight at the entrance of a nest which contained a female brooding young on June 22 was well into the eclipse plumage. Both drakes above mentioned were able to fly and as far as could be seen had not as yet lost any primary wing feathers.

The time of nesting and the number of eggs in a clutch is shown in the following table.

DATA RELATIVE TO THE NESTING OF WOOD DUCKS IN CALIFORNIA

Date of Record	Eggs in Set	Incubation
April 13, 1922	12	began April 9
April 14, 1923	13	hatched April 15
April 30, 1923	14	began April 30
April 30, 1923	14	began April 30
May 3, 1922	10	one-third
May 19, 1923	14	began May 19
May 20, 1923	10	fresh
May 30, 1923	10	fresh

Fresh eggs have been found as early as April 1 and as late as May 30. The average number of eggs in eight nests was 12, with 10 and 14 as extremes. One egg is laid each day until the set is complete. Usually the eggs are laid during the forenoon, but in one instance the female laid her eggs regularly during the late afternoon or evening. The eggs of the Wood Duck are frequently infertile. Out of one set of 12 eggs only 5 eggs hatched. In another nest which originally contained 14 eggs, one egg was broken during incubation, 4 eggs were infertile, and 2 young died in the shell, so that only 7 eggs hatched. Out of 97 eggs contained in 8 nests only 51 were definitely known to have hatched. Two nests were destroyed by predatory animals and two more were abandoned by the ducks, due to fright.

This figures 6.4 young per nest. It is a common fallacy to figure the rate of reproduction of a game bird according to the number of eggs laid rather than by the number of eggs which hatch.

The following two accounts, one of an unusually tame female and the other of the usual timid type, afford a basis for comparison and are here given in detail.

In 1922 the "tame" female made her nest in a natural cavity, seven feet up, in the main trunk of a large willow. This tree had originally been one of a row of fence posts that had taken root and grown (see fig. 19). The top of the original post had rotted away, forming, in time, a warm, dry, natural cavity eighteen inches long, six inches wide, and eighteen inches deep. The top of this cavity had been accidentally roofed over by a number of one-inch redwood weir boards that belonged to a headgate of an irrigation ditch which ran beside the tree.

The first egg was laid in this nest on April 1. One egg was laid each day until twelve eggs completed the set. Incubation began April 9. No nest material other than the down and a few stray feathers from the body of the female was in evidence. The eggs were laid on the soft, dry, rotten wood that covered the floor of the nest cavity. The nest proper was twelve inches long, ten inches wide, and five inches deep, outside measurements. The corresponding inside measurements were six, five, and three and a half inches. The twelve eggs were arranged in one layer. When the brooding female was frightened from the nest they were left uncovered (as shown in fig. 22). When unmolested she always carefully covered the eggs with down before leaving the nest (see fig. 23). This precautionary measure helped to keep the eggs warm while the female was off feeding and also kept the eggs from the prying eyes of numerous California Jays that regularly searched the willow row for eggs of other birds. The ease with which these jays find and destroy hen's eggs shows that they could easily despoil a Wood Duck's nest if they found one.

Soon after the female Wood Duck began to incubate her eggs some people living nearby lost a tame duck that "hid out" on her nest. One of the smaller children of the family found the Wood Duck nesting in the tree, reached in, picked her up and carried her in triumph to his mother, saying, "Mother, here is that duck that we lost." The mother of the boy replied, "Oh! No! that is a Wood Duck. You must turn her loose so that she can go back to her nest." This was done and, to everyone's surprise, the bird did return to her eggs that evening. Several days later I visited the nest, at 7 o'clock in the evening. An hour previous to this visit the female had been absent and the eggs carefully covered with down, but now, upon my reaching into the nest cavity, the female was found at home. She uttered a low, hissing note when stroked with my bare hand and tried to peck at and bite my fingers. She did not attempt to leave the nest but stood her ground.

The nest was visited by me the following morning at six o'clock. The brooding duck made no effort to escape even when I moved some of the boards above the nest to one side and photographed her on her nest (see fig. 24). The only movement that she made during the two-minute exposure was to occasionally blink an eye.

The nest of the second Wood Duck was found in a dead willow stub, 15 feet above the ground, in what had been an old flicker nest. Entrance had been gained through a hole in the upper part of the snag and not through the flicker hole, which was in firm wood. The nest cavity was twenty inches long and less than eight inches in diameter. No grass or leaves had been used in making the nest, which consisted entirely of down and feathers from the female. Although the nest tree was heavily infested with ants, these insects did not appear to molest the brooding bird. On May 3, 1922, this female was not on her nest at 6 o'clock in the evening,

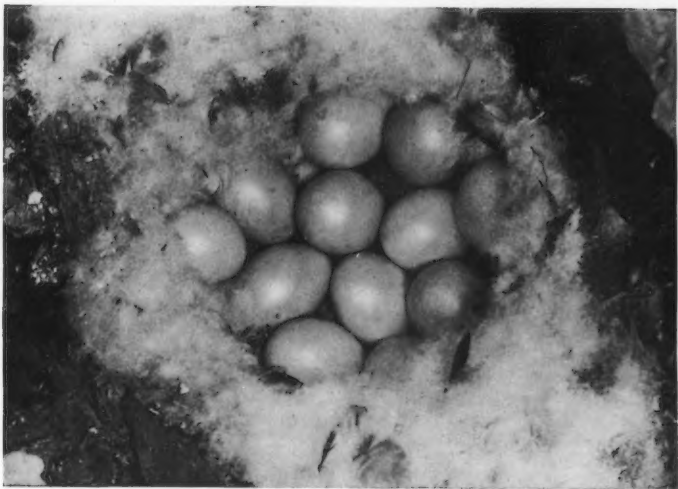


Fig. 22. WHEN THE BROODING BIRD WAS FRIGHTENED FROM THE NEST, THE TWELVE EGGS, WHICH WERE ARRANGED IN ONE LAYER, WERE LEFT UNCOVERED AS HERE SHOWN.



Fig. 23. WHEN UNMOLESTED, THE DUCK CAREFULLY COVERED THE EGGS WITH DOWN WHEN SHE LEFT THE NEST. THE DOWN KEPT THE EGGS WARM AND ALSO PROTECTED THEM FROM PRYING EYES OF PREDATORS. POSITION OF CAMERA THE SAME AS IN FIG. 22.

at which time the eggs were completely covered with down. When I again visited her an hour and a half later, the female flushed easily but returned to her nest in ten minutes. She circled around the nest a few times and then lit on a small limb about three feet from the entrance to the nest. Here she balanced herself gracefully on a rather insecure perch, and craned her neck, watching me as I lay concealed in the grass thirty feet distant. The eyesight of this female was good, in the gathering darkness, far better, I should judge, than average human sight; she obviously detected a slight movement of my hand, while I had difficulty in following her movements even though she was outlined against the sky. After watching me for a few minutes she fluttered with amazing ease through a tangle of small branches and scrambled down the entrance into the nest. The following morning this female was seen flying about, with her mate, near the nest. In the evening she arrived with her mate, both birds alighting in the branches of the nest tree. The female refused to return to her eggs, although watch was kept, at a distance, until ten o'clock that night. The set of ten abandoned eggs, all about one-third incubated, was collected, together with the down, for the Museum of Vertebrate Zoology.

It has been recorded that "twigs, grass and leaves" are used by the Wood Duck as nest material. A careful examination of all nests found, brought out the fact that in no instance had any nesting material, other than down, been carried into the nest cavities by ducks. In every instance rotten wood, bits of bark, twigs, and dead leaves had fallen naturally into the nest cavity. By actual experiment, it was found that if the larger obstructing chunks of bark and wood were removed, a pair of Wood Ducks would accept certain cavities as nest sites, whereas when this was not done, these particular cavities were investigated but "passed up" by the ducks. Ordinarily the female scratched the bark and bits of rotten wood away from the center of the cavity, thus forming a depression two or three inches deep. This nest she lined with down plucked from her breast, as was verified by catching and examining a brooding female. Sometimes a goodly amount of down is deposited as the eggs are laid. In one instance a nest containing 10 fresh eggs, which the duck had not yet begun to incubate, contained also a large amount of down. At the other extreme, one nest contained very little down; but all the nests examined contained some down. There is a tendency for the down to felt together and to decrease in bulk as incubation approaches completion.

It has been stated that species of birds which nest in cavities lay, as a rule, white eggs, the color of the egg supposedly being of little importance under such circumstances. If the eggs of the Wood Duck were really "protectively" colored they would be nearly black instead of the color of old ivory which makes them so conspicuous in the dark nest cavity. The female Wood Duck protects her eggs from prying eyes by covering them with a blanket of down when she leaves the nest to secure her food. In addition to concealing the eggs, the covering of down also tends to conserve heat and so keep the eggs warm. In two instances, while the female was off, I inserted a thermometer among the down-covered eggs. In the first instance the female had been off the nest about one hour and the temperature in the nest was 89°. In the second instance the female had been off close to three hours and the temperature was 83°. Both nest temperatures were 4 or 5 degrees higher than that which prevailed at the time just outside the nest. In one instance a female was frightened off her nest at 8 o'clock in the morning. I promptly covered the eggs with down, since the female in her hurried flight had no time to do this. Although the female remained off the nest all day and did not return to her eggs until 8 o'clock that evening, all 13 eggs in the nest hatched two days later.



Fig. 24. A "COON'S-EYE" VIEW OF A WOOD DUCK ON HER NEST. ON ACCOUNT OF THE DEPTH AND DARKNESS OF THE NEST CAVITY A 2-MINUTE EXPOSURE WAS NEEDED TO SECURE THIS PHOTOGRAPH.

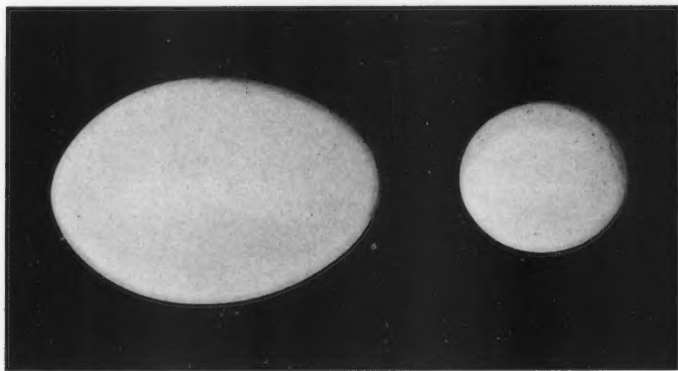


Fig. 25. EGGS OF THE WOOD DUCK, NATURAL SIZE, SHOWING EXTREMES IN SIZE AND FORM.

The color of many eggs of the Wood Duck are suggestive of old ivory. The shell is hard, close-grained and of moderate polish. Certain eggs tend toward an ovate form (see fig. 22). In one set the eggs were quite slender; and in this set we find almost as great extremes, 55.0 and 37.0 millimeters for length and breadth respectively, as was found by Bent (Life Histories, 1923, p. 162) in examining a series of 99 eggs. His longest egg is given as measuring 55.5 millimeters and the narrowest 37.3 millimeters. In one instance two runt eggs, both infertile, were found in a set of otherwise normal eggs. Two extremes in size and form of eggs are illustrated by fig. 25. After weighing a number of sets, it is the author's belief that the weight of the egg, allowing for incubation, is a more reliable indicator of its true size or bulk, than measurements of length and breadth.

MEASUREMENTS IN MILLIMETERS AND WEIGHTS IN GRAMS OF 28 WOOD DUCK'S EGGS.*

Length	Breadth	Weight	
55.0	38.0	42.2	Incubation 1/3
57.0	39.3	46.3	
54.0	38.0	40.9	
54.3	38.3	42.0	
54.5	38.0	41.8	
52.7	37.0	39.5	
51.4	36.7	37.4	
52.0	38.0	40.7	
54.0	38.4	42.0	
53.4	38.0	41.3	
52.5	40.5	47.0	Fresh
52.7	40.4	47.3	
52.0	40.0	46.6	
52.3	40.2	46.5	
52.0	40.3	47.0	
52.0	40.5	47.1	
52.0	40.5	47.2	
50.0	38.0	40.7	Fresh
51.0	39.0	43.0	
50.2	39.3	42.2	
49.6	39.7	42.1	
49.3	38.0	40.5	
52.5	39.4	44.3	
51.0	39.5	43.5	
52.5	39.2	43.7	
51.5	39.0	43.3	
35.7	29.7	22.2	Runt eggs, infertile
29.5	26.5	10.0	

Incubation often begins before the set is complete. For example, one female laid twelve eggs, but she *began* to incubate the day the ninth egg was laid. The period of incubation for the Wood Duck is usually given as 28 to 30 days. However, I found in four known instances that the time which elapsed from the time the female first began to incubate until the young were out of the shell, was 30, 30, 31, and 32 days, respectively.

During the period of incubation the daily program of the Wood Ducks was found to be as follows: My visits to nests, made early in the morning between the hours of 4:30 and 7:30, showed that the female often left the nest, usually about 6 o'clock, to forage. Returning at 7 or 7:30 o'clock, she spent the entire day on the

* Weights given are of eggs and contents, before the eggs were blown.



Fig. 26. FEMALE WOOD DUCK "HIDING" BY CROUCHING MOTIONLESS LENGTHWISE OF A DEAD BRANCH 25 FEET DISTANT FROM THE CAMERA.



Fig. 27. FEMALE WOOD DUCK CALLING TO HER YOUNG IN THE NEST. THIS PERCH WAS USED REGULARLY WHEN IT WAS IN THE SHADE, BUT IT WAS NEVER OCCUPIED WHEN THE SUN SHONE ON IT.

nest. Between 5:30 and 7:30 in the evening the female again covered the eggs with down and then left the nest, flying directly to the feeding pond half a mile distant, where she re-joined the drake which had spent the day in hiding amid the dense growth of willows and water weeds (see fig. 21). The lower end of this feeding pond was choked with a dense growth of marsh grass, burdock, and water buttercup. Here I watched with binoculars the female as she fed 50 yards distant, but never saw her dive while feeding. Her head was thrust forward and the bill extended horizontally along, just beneath or near the surface of the water, as she swam slowly along. At other times she stopped and daintily picked off green sprigs of the water buttercup. After a hurried meal the female took wing, and she was sometimes accompanied by the drake on her return to the nest. The male spent considerable time, both mornings and evenings, in perching in or near the nest tree after the female had returned to her eggs.

When returning to the nest, the female always led the male. The ducks never flew directly to the nest but always chose certain preliminary perches, usually 50 to 150 feet distant from the nest tree. The ducks nearly always perched side by side amid dead brush or on limbs in the shade (see fig. 20). On one occasion only did I see the ducks perch in the open in the sunshine. When perched near the nest, the female sometimes crouched motionless, blending with the branches so as to escape notice (see fig. 26). At other times she craned her neck and peered cautiously about in all directions (see fig. 27). If nothing frightened her she would, after waiting from 5 to 10 minutes, fly quietly over to the nest tree where she would again sit motionless watching for another five minutes before finally fluttering into the nest.

In another instance the female duck always perched flicker-fashion at the entrance of the nest (see fig. 28). At a distance of twelve feet the white ring around and behind the eye was very conspicuous. This duck clung easily to the rough bark with her claws and braced her body by spreading her tail and pressing the relatively stiff tail feathers against the tree in true woodpecker style. When this female desired to leave the nest she first peered cautiously out of the nest (see fig. 29). After a number of such inspections she squeezed out of the entrance, which was a tight fit (see fig. 30), and launched swiftly forth into the air (see fig. 31).

On June 1, 1923, I spent the entire day hidden in dense grass 80 yards distant from a Wood Duck's nest. At that distance I could not with the naked eye make out the outline of the female duck as she sat in the shade in a tangle of dead branches near the nest. But by aid of binoculars I could follow every motion of the duck. When I raised my hand cautiously above the grass and moved it slowly back and forth, the duck at once caught sight of it. This experiment was repeated several times from different locations with the same result. On other occasions the birds demonstrated, to my satisfaction, that their eyesight and hearing were better than my own.

The first indication of the eggs hatching became apparent on the 28th to the 30th day of incubation. At this time a section of the shell about the size of the end of a match was pushed up from *within* the egg. This was apparently done by the duckling pressing outward with its bill, which is tipped with a hard calcareous nodule. At the same time cracks appear, radiating from the raised section. Even at this early stage in hatching the duckling inside the egg-shell could be heard peeping faintly. After the first attack the birdling rests and the only notable change during the next few hours is the gradual extension of the cracks in the shell. Three-fourths of the 40 eggs under observation hatched during the night. In one instance an egg which failed to hatch had a hole punched into it from the outside. At first it was thought that the mother had done this in an endeavor to assist the young to escape from the shell; but

FIG. 28. THE FEMALE PERCHED FLICKER-LIKE AT THE ENTRANCE TO HER NEST.



FIG. 29. THE DUCK PEERED OUT CAUTIOUSLY TO SEE IF THE COAST WAS CLEAR.



the punching of the hole may have been accidentally made by a piece of rough wood in the nest. As shown by an examination of the egg shells, the normal method of escape was for the young one to force, with its bill, a row of ruptures completely around the egg so that the egg shell was eventually forced apart in two complete but unequal segments, as though it had been opened from the inside with a can opener.

The hatching of the eggs proved to be a very slow process. In observed cases, 24, 24, and 48 hours elapsed between the time when the first egg was pipped and the emergence of the young one from the shell. It was found that, in nests where all the eggs were pipped about the same time, the time of hatching was uniform and that the downy young had greater vitality than where the reverse was the case. If the first break in the shell was delayed for more than 36 hours it was a sure sign of weakness on the part of the embryo; and in cases where the pipping was long delayed the embryo although fully formed died in the shell. Furthermore, it was found that if the ducklings did not have vitality enough to break the shell themselves, it was useless to do it for them, since "helped" ducklings always lacked vigor and sooner or later were left behind. Nature may seem harsh at times, but she plays no favorites.

Audubon's statement, which has been widely quoted by many subsequent writers, to the effect that the young leave the nest "the moment they are hatched" must be regarded as an example of "literary license." When the young Wood Duck first emerges from the shell it is wet, bedraggled, and scarcely able to hold up its head. The ducklings change wonderfully in a few hours after hatching; but at first the natal down, which is so fluffy and soft in day-old ducklings, appears stringy and hair-like. Each feather seems to be inclosed in an exceedingly thin parchment-like sheath or capsule which breaks away and is loosened by the ducklings preening their feathers while in the nest. This period of preening in the nest is essential to the successful career of the young. By actual observation of three broods, it was from 2 to 5 hours from the hatching of the young until the down was dry and fluffed out. When an intruder approached the nest containing young recently hatched, the ducklings scrambled or dived headlong into the mass of down which lined the nest. They thus became quite hidden from view, and, looking into the nest, one receives the impression that the nest contains only broken egg shells and a mass of down. If the observer remains quiet a few minutes, the ducklings peep forth from the down, and are soon busy tumbling about, pecking at each other's bills, and preening their feathers, which fluff out at an amazing rate.

In 1923 three broods of young Wood Ducks were actually seen to leave the nest. Another brood was watched but slipped out of the nest unobserved while I was foolishly waiting for the female to come and carry them out in her bill. In all three observed instances the young ducks left the nest entirely under their own locomotive power. In no case was any of the young carried out of the nest in the bill or on the back of their mother. I do not wish to imply that the young are never carried out by their mother, because I can readily understand how this method *might* be employed where the nest was high up in a tree and some distance from the water. The question is not whether the female *ever* carries the young, but rather what is the *usual* method of departure of the young from the nest. Various observers testify to the fact that the majority of Wood Ducks nest over or near water. My own experience in California has been that 80 per cent of the nests found were over water. This fact, as well as actual observation, shows that the usual method is for the young ducks, when about 24 hours old, to scramble out of the nest by aid of their own legs and wings. A female duck flying about carrying a duckling in her bill would naturally attract one's attention, and being spectacular would be most likely to be recorded. Further-

FIG. 30. SHE THEN SQUEEZED THROUGH THE ENTRANCE, WHICH WAS A TIGHT FIT.



FIG. 31. AND LAUNCHED SWIFTLY FORTH INTO THE AIR.



more, the actual time taken up in removing the young would be relatively long. Since the female would have to make many trips to and from the nest, the chances of her being seen would also be increased. Where the young depart of their own accord the whole brood was, in observed cases, out of the nest and into the water in less than three minutes; and unless one watches the nest constantly the departure of the young can easily be missed, even when looked for.

The three instances where young Wood Ducks were seen to leave the nest are here described in detail. The first nest was in an old, somewhat enlarged, flicker hole, situated 10 feet up in a willow stub which grew directly over the water (see fig. 18). The ducklings left this nest at 8:30 in the morning, accompanied by their mother. In leaving the nest the ducklings appeared at the entrance *ahead* of their mother, who seemingly encouraged and urged them along. Arriving at the entrance the ducklings took flight readily and fluttered down one after the other to the water ten feet below the nest. The mother then flew down amid her offspring and, swimming off, led the ducklings into a nearby tangle of water weeds. Two days later the young ducks were found feeding and swimming about in a compact flock near the nest tree. When first found they were unattended by either parent but were joined a few minutes later by their mother.

The data for the second brood is as follows. Incubation began April 30 with 14 eggs in the nest. One egg was broken 10 days later. The remaining 13 eggs showed no sign of hatching on May 29 at 6 p. m. Eleven of the eggs showed slight cracks at 10 a. m. on May 30. At 7:30 p. m. on May 31, the female was off the nest feeding, but none of the eggs had hatched. At 8 a. m. on June 1, all 13 eggs were hatched and the young were still wet. The young left the nest at 9 a. m. June 2, when 25 or 26 hours old. This nest was 10 feet up in a large natural cavity of a live bushy willow growing over the water. The entrance of the cavity was only 6 inches above the nest and the young were able to climb out with ease. In this case the young were called out of the nest by the female as she swam about within 50 feet of the base of the tree. This nest call reminded me of the spring call note of the flicker heard in the distance and was recorded on the spot as *kuck, kuck, kuck, kuck, kuck, kuck*, repeated rapidly from 5 to 12 times. As the female called the second time, I looked up at the nest again just in time to see the ducklings scramble to the entrance in single file and then flutter down through a maze of dead branches into the water beneath the nest. One youngster fell clear of the limbs, but the drop of ten feet was eased by the use of the spread tail and wings, so that the impact on the water was slight. Some idea of the extreme lightness of these downy young may be had from the fact that two of them were caught and were found to weigh 16 and 17 grams, respectively. The average weight of 3 adult female Wood Ducks was found to be 615 grams. The downy young, with wings and tail spread, present a flight surface of about 5 square inches, while the adults in flight present about 90 square inches to the resistance of the air. The young thus weigh 3.2 grams per square inch of flight surface while the adults are twice as heavy, weighing 6.8 grams per square inch of flight surface.

The whole brood of young were out of the nest and into the water in less than two minutes by the watch. As soon as they struck the water the ducklings dipped their bills into it, fluffed out their downy feathers and began paddling about. In spite of this activity they kept together in a compact flock. While in the nest, as well as after leaving it, the ducklings kept up a constant low twittering which reminded me very much of the rhythmic flight-song of the Willow Goldfinch. This twittering call served as a means whereby the flock kept together. The mother duck called



Fig. 32. A NORMAL BROOD OF 13 DOWNY WOOD DUCKS.



Fig. 33. THEY PAUSED AND PECKED AT THE WHITE PETALS AND GREEN STALKS OF THE WATER BUTTERCUP.



Fig. 34. ONE DUCKLING SCRAMBLED TO THE ENTRANCE OF THE NEST AND PEERED OUT.



Fig. 35. AND THEN SPRANG, WITH WINGS AND TAIL SPREAD, INTO THE WATER. NOTE THAT THE DUCKLING SPRANG, AND DID NOT FALL, OUT OF THE NEST.

Fig. 36. YOUNG WOOD DUCK CLIMBING A WILLOW TREE. REPEATED EXPERIMENTS SHOWED THAT THE DUCKLINGS COULD EASILY CLIMB OUT OF THE DEEPEST NEST CAVITIES.



Fig. 37. THE DRAKE RETIRED EACH MORNING TO A CHOSEN POND RIMMED WITH WATER WEEDS AND SHADOWED BY WILLOWS. HERE HE SPENT THE DAY IN SECLUSION.



excitedly when she saw the young coming out of the nest; as soon as they had flocked together on the water she called again and the young started and swam in single file through the pond weeds toward her. The female then called the ducklings across the pond into some mats of blossoming water buttercup. Here they swam about with evident delight (see fig. 32); or they paused and pecked at the white blossoms or green filament-like stalks of the water buttercup (see fig. 33). Upon my close approach, the mother fluttered about on the surface of the water in an attempt to distract my attention from the young. Failing in this, she flew across a deep slough and lit in a pasture and again called the young. The ducklings swam after her and joined their mother on the other side of the slough. To my surprise the old duck then abandoned the water and led the ducklings, following in single file, out into the dense grass of a dry pasture where subsequently I was unable to find them.

The history of the third brood of young was as follows. Incubation began on May 19, with 14 eggs in the nest, one of which was broken some time during the incubation period. This was a second laying, the first set of eggs having been broken up by a raccoon. The first eggs were pipped on June 18 at 6 p. m. Twenty-four hours later all 13 eggs were pipped, but the young were not actually out of the shell until 7:30 on the morning of June 21. The young did not leave the nest the day they were hatched, so I slept beside the tree that night; but there was no activity on the part of the Wood Ducks during the night. The female spent the night on the nest; but at 7 o'clock the next morning she slipped out of the nest and flew off for her breakfast. While the female was gone the ducklings in the nest became very active, scrambling about over each other and twittering loudly. At 8:20 a. m. one duckling scrambled to the entrance of the nest, peeping loudly. It stood there for a moment (see fig. 34) and then sprang with wings and tail spread (see fig. 35) directly toward the water which flowed in an irrigation ditch 8 feet beneath the nest. The first duckling had scarcely touched the water when it was followed in quick succession by the remainder of the brood, so that the nest was emptied in less than 3 minutes. The speed of the ducklings when they struck the water was little if any greater than when they sprang from the nest. I can see no reason why they could not flutter down from a height of 30 or even 40 feet just as safely as from 10 feet.

The ability of the young to scramble out of a deep nest cavity in a hollow tree has been questioned by some people. By repeated trials I found that the ducklings were able readily to climb up the nearly vertical trunk of a willow (see fig. 36). So effective are their sharp little claws that the ducklings sometimes fall over backwards, hang head downward by one claw, and then scramble back and regain their upright position without falling. No one who has actually watched a brood of young Wood Ducks scramble out of their nest would question their ability to climb.

After the ducklings left the nest they swam about, keeping together in a close flock and hiding under clumps of sedge at the water's edge. One that I attempted to capture eluded my grasp by diving like a flash and swimming a distance of 10 feet under the water. Had the water in the ditch been deep I would have been unable to catch the youngsters. About half an hour after the young had left the nest, the female appeared, flew around the nest tree, and hearing the twittering of the young, called them to her. The whole family then swam off together down the ditch to a slough where the male had been accustomed to hide. Here the parent ducks tended their offspring and raised them to maturity.

Berkeley, California, July 17, 1923.

THE BIRDS OF THE TODOS SANTOS ISLANDS

By JOHN VAN DENBURGH

LA BAHIA de Todos Santos, or All Saints' Bay, on which is situated Ensenada, the principal port of the northern district of Lower California, is a moderately well sheltered harbor. Its northern shores are guarded by high rocky hills along the base of which runs the road from Tijuana. South of the city of Ensenada the surf breaks half-heartedly on a beautiful half-moon beach of white sand backed by low dunes. To the southwest the particolored rocks of Punta Banda rise and stretch out toward the north as though trying to reach and reclaim two little islets which guard the western side of the bay—Las Islas de Todos Santos.

Some three miles of water intervene between Punta Banda and the southernmost of these islets, but a long series of projecting and submerged rocks indicates their former union. The smaller, northern islet lies but a fraction of a mile from the larger one, its separation evidently having been effected by the ceaseless pounding of the waves.

These islands had been visited before by naturalists interested in their birds and mammals, but nothing was known regarding reptile life upon them. We, therefore, felt that they were well worthy of investigation, and planned to spend several days there. In San Diego, Mr. A. W. Anthony accepted our invitation to accompany Mr. Slevin and myself. A few hours' automobile ride took us to Ensenada, where we hired a boat and purchased provisions and water.

Our boatman, Chris, was a genuine salt, a deep-sea sailor of the old school, but not old in years, rugged, powerful, willing, good-natured, competent, and trustworthy in spite of an all-consuming thirst. By three o'clock in the afternoon he had transferred us and all our belongings from the pier at Ensenada to his trim gasoline sloop. A few minutes later he started the engine, and we chugged off for the twelve mile run across the bay.

The blue water was but slightly disturbed by the afternoon breeze. The air was clear and warm. The islets, distinct but tinted by a faint blue-gray veil, gradually gained height as we drew nearer. The one Heermann Gull, which had followed us across the bay, departed. A few Dark-bodied Shearwaters flew rapidly by. As we approached the islands birds grew more numerous. Hundreds of Western Gulls, Farallon and Brandt cormorants and Brown Pelicans, separately and in great mixed flocks, wheeled and swam and dove in pursuit of schools of small fish. Sometimes they sought them in the open blue waters, sometimes where the kelp-beds shone in the sun like burnished gold, sometimes languidly when the school swam deeper, or again with excitement and strenuous charges as the fishes, perhaps driven from below by other enemies, ruffled large areas of the surface with their fins.

South Todos Santos Island is about one and a quarter miles long by half a mile wide. The rocky hills near its southern end rise three hundred feet, or more, above the sea. Its shores are precipitous, sheer cliffs rising from the water or from narrow rocky beaches in little coves. The best landing place is in a small, sheltered cove near the southeast end of the island. Here several Japanese fishermen greeted us and helped Chris carry our possessions up to the spot we selected for our camp. This done, Chris sailed away, leaving behind him a skiff for our use. We pitched our tent, stowed our provisions, arranged our beds, cooked and ate our evening meal, set some traps, and were ready for a night's sleep.

With darkness came a host of mice, springing the traps almost as fast as they could be reset. A dozen were caught in a few minutes, and through the rest of the night mice ran over us and our belongings. The native wood-rats of the island are more retiring. We found them only near their homes of piled sticks. These they often erect upon a thick foundation built of stones an inch or two in diameter. These rats (*Neotoma anthonyi*) and mice (*Peromyscus maniculatus dubius*) are the only native land mammals of the islands. Cats have been introduced and probably will soon exterminate the native mammals, reptiles and smaller birds. Snails, centipedes, scorpions, spiders, ants, beetles and various other insects are numerous. We saw no fleas. Of reptiles, we found six species, two snakes and four lizards.

Observations on the birds of the Todos Santos Islands have been published by H. B. Kaeding (Nidologist, iv, no. 9, 1897, p. 109; Condor, vii, 1905, p. 105), A. B. Howell (Condor, xiv, 1912, p. 187), G. Willett (Condor, xv, 1913, p. 19), and E. W. Nelson (Mem. Nat. Acad. Sci., xvi, 1921, p. 85). The following list includes the species observed by them as well as those which we found, a total of 54. Unless otherwise stated, our notes refer to South Island, on which we camped from May 24 to May 30, 1923. We spent several hours on North Island, May 27.

Ptychoramphus aleuticus. Cassin Auklet. This species was not seen by us although Kaeding reported it in 1897 and Willett found it breeding in small numbers, April 25, 1912.

Brachyramphus hypoleucus. Xantus Murrelet. Kaeding found this murrelet fairly common. We heard its notes at night as it flew past our camp. No living birds were seen, but the white-lined wings and neatly turned skins of several eaten by cats were found on various parts of South Island. I found one broken egg shell in the middle of a large field of iceplant, near the north end of this island, more than a hundred feet from any holes or rocks or bushes. One dead bird was discovered on the ground under a low bush of very dense, spiny growth where it probably had intended to nest.

Larus glaucescens. Glaucous-winged Gull. We saw a single gull of this species flying with the hundreds of Western Gulls over the north island, May 27.

Larus occidentalis. Western Gull. This bird ranked first in point of numbers. Many nests were found on the northern half of each island. Most of the nests were in scattered colonies, but a few seemed to have no near neighbors. All that I saw were slight hollows in the ground lined with grass and often a few feathers. A few were well hidden under bushes, but most were either entirely unsheltered or were placed a foot or two from some bush or boulder. The gulls in certain colonies had not yet laid but were found sitting on empty nests. In other colonies, a few empty nests and a few nests with newly-hatched young were found among the many containing two or, usually, three eggs. The sets, both of two and three eggs, varied in incubation from fresh to far advanced. Few of the eggs varied much from the usual types of coloration, but one set containing a bluish-gray egg with few markings was found, and on May 27 a beautiful set of three fresh eggs was secured in which the browns of other eggs are replaced with red and pink, as sometimes happens in the eggs of jays and crows. I never saw a gull destroy an egg of its own species, but no unguarded nest of a cormorant was safe from attack and I saw them eat pelicans' eggs also. This they usually did by breaking the eggs in the nest, but one gull attempted to fly off with an unbroken egg of this species. The large egg quickly slipped from the gull's bill and rolled down the hill with the gull ludicrously following and picking it up only to lose it again and again. More gulls were nesting on the northern than on the southern island.

Larus californicus. California Gull. This gull, recorded by Kaeding, was not seen by us.

Larus heermanni. Heermann Gull. At the time of Kaeding's visit (March 10, 1897) this species was common. Howell (April 15 to 20, 1910) saw a few. Willett (April 25, 1912) observed one. A single bird, which followed us from Ensenada nearly to the islands, afforded our only record.

Sterna maxima. Royal Tern. This bird was not seen by us. It has been recorded by Howell and Willett.

Puffinus griseus. Dark-bodied Shearwater. A few individuals of this species flew past us as we drew near the island on our trip out from Ensenada, and again when we were leaving on the return trip.

Phalacrocorax auritus albociliatus. Farallon Cormorant. This species was not greatly outnumbered by the gulls. The largest nesting colony was near the northern end of the southern island. The nests, always composed largely of sticks and twigs, were built on low bushes and rocks from fifty to a hundred yards back from the shore. A few rested directly on the ground of the hillsides. Slopes were chosen in preference to more level areas. Many built in or near the colony of brown pelican nests. Western Gulls nested on the flat below. Many of the nests of the cormorant were decorated with long, black quill-feathers, often stuck nearly upright near the rim of the nest. In and near the pelican colony most of the cormorant nests held recently-hatched, naked, black young. Elsewhere only eggs or empty nests were found. Full sets contained often three, usually four, rarely five eggs. Many of the eggs were fresh, but most were somewhat advanced in incubation. No nests were found along the eastern side of the south island, but a few birds sitting on empty nests were seen near the southwestern point of this island. A small colony was found near the northern end of the northern island, where the nests were built upon bushes and cactus. A few contained eggs, but nearly all had been robbed by the gulls. The cormorant seems to be the Chinaman of the bird world. The gulls and the ravens delight in attacking his home and family, and he never actively opposes them. Twice I saw two ravens frighten cormorants from their nests and then make off with an egg apiece. The gulls are not so aggressive. They wait until the cormorants leave their nests. Then the gulls alight on the nests and eat or carry off the eggs or young. If the parent bird returns, the gull leaves from one side of the nest as the cormorant alights on the other. There is never any show of animosity.

Phalacrocorax penicillatus. Brandt Cormorant. This bird was less numerous than the Farallon Cormorant. Three colonies were found, two on South Island and one on the northeastern side of North Island. All were close to the edge of the sea-cliffs. In the colony on the north shore of South Island the sea-weed nests all held large young. The birds of the east-side colony on this island were just locating their nesting sites. Those on North Island had eggs and young of various ages.

Pelecanus californicus. California Brown Pelican. A group of nests was found near the northern end of each island. The nests on the northern island were much fewer, only fifteen or twenty, as against perhaps ten times this number in the southern colony. Some of the nests contained young, but most held three eggs. A few of the eggs were fresh. Late one afternoon, after the pelicans had given an exhibition of high diving, a dozen or more of them began to circle higher and higher until they looked like hawks soaring in the sky, all revolving in the same direction at different heights. After a time, one reversed the direction of its flight. In a few moments all had reversed their circles. For some minutes more they soared, then one flapped its wings and started north, toward their nesting grounds, and the others lined up behind it.

Phalaropus fulicarius. Red Phalarope. Willett records one bird seen April 25, 1912.

Heteractitis incanous. Wandering Tattler. Kaeding saw this species along the beaches, March 10, 1897. Howell reported lone birds rather common during his visit, April 15 to 20, 1910.

Arenaria melanocephala. Black Turnstone. Kaeding (see Taylor, Nidologist, IV, 1897, p. 109) and Howell both found this turnstone.

Haematopus frazari. Frazar Oystercatcher. Kaeding and Howell both found this bird. Howell states that it was rather common and found usually with the Black Oystercatcher in small flocks of from two to six individuals.

Haematopus bachmani. Black Oystercatcher. We found a few pairs on South Island. On May 30 I found an excited pair near the northern end of this island. Search finally revealed a few empty mussel and limpet shells on the rocks above the sea, and nearby were two handsomely colored young oystercatchers perhaps a day or two old. The two differed somewhat in color and one was noticeably larger than the other. I could not find a third.

Zenaidura macroura marginella. Western Mourning Dove. One was seen May 29.

Buteo borealis calurus. Western Red-tailed Hawk. One was found by Kaeding, March 10, 1897.

Haliaeetus leucocephalus leucocephalus. Southern Bald Eagle. This eagle has been recorded by Kaeding, Howell and Nelson. We saw none. Howell mentions a nest part way up an overhanging cliff, and Nelson says a nest was found on the top of a rocky pinnacle just off the northern end of South Island.

Falco peregrinus anatum. Duck Hawk. Howell found the nest of a pair, April 16, 1910, on a "sugar loaf" three hundred feet above the sea, and took four badly incubated eggs. I saw nothing of this species until late in the afternoon of May 29, when one flew over my head and lit on a tall rock near the center of the South Island. The noise of my collecting pistol frightened it and it flew out over the bay toward Ensenada until I could just distinguish it. It then turned back and flew rapidly to North Island.

Falco sparverius phalaena. Desert Sparrow Hawk. Kaeding found this hawk March 20, 1897, but it has not been reported by subsequent observers. During our visit two pairs were constantly present near our camp on South Island, and I believe that at least one of these pairs was nesting in a hole in a cliff. They frequently were seen in pursuit of the ravens and were very noisy.

Pandion haliaetus carolinensis. American Osprey. We saw no ospreys. Kaeding took a set of eggs on March 10, 1897, and Howell, in April, 1910, found one pair in possession of one of five old nests, but no eggs had as yet been deposited.

Aluco pratincola. American Barn Owl. Kaeding saw a few on March 10, 1897. Howell found a nest in a deep cleft of the rocks twenty feet above the sea, which, on April 16, 1910, contained a single nestling two-thirds grown. We saw no owls.

Speotyto cunicularia hypogaea. Burrowing Owl. The only record is Kaeding's of March 10, 1897.

Colaptes cafer collaris. Red-shafted Flicker. Kaeding and Howell each saw one.

Phalaenoptilus nuttalli californicus. Dusky Poorwill. A single bird was recorded by Howell.

Aeronautes melanoleucus. White-throated Swift. Howell, Willett and I each observed several.

Calypte costae. Costa Hummingbird. Hummingbirds were numerous and two nests containing young were found in small bushes. Two or three adults which we shot were of this species, which already has been recorded by Kaeding and Willett.

Calypte anna. Anna Hummingbird. This species was found by Kaeding and Howell.

Selasphorus rufus. Rufous Hummingbird. One seen by Howell is the only basis for recording this species.

Tyrannus verticalis. Western Kingbird. This species was noted by Kaeding and two pairs were observed by Howell. We saw none.

Myiarchus cinerascens cinerascens. Ash-throated Flycatcher. One was seen by me on May 25 and later collected by Mr. Anthony.

Sayornis nigricans. Black Phoebe. We did not see this species. Kaeding and Howell each recorded a pair.

Myiochanes richardsoni richardsoni. Western Wood Pewee. Howell saw one bird of this species. We found a pair in a sheltered situation near the center of the southern island, where the tallest bushes grow.

Corvus corax sinuatus. Western Raven. One or more of these birds could be seen at almost any time near our camp. They frequently flew to the high cliff at the southern end of the island. One morning I counted nine in sight at one time. I saw two at the northern end of South Island stealing cormorant eggs.

Sturnella neglecta. Western Meadowlark. This bird has not been noted on the Todos Santos Islands since Kaeding saw a few there March 10, 1897.

Carpodacus mexicanus clementis. San Clemente House Finch. House finches are common on both islands. On South Island many full-grown young were seen and many old nests were found in cactus. On May 30, I took a set of three slightly incubated eggs. House finches were recorded by Kaeding, Howell and Willett. It would seem improbable that the bird found here is really the same as that on San Clemente Island.

Astragalinus psaltria hesperophilus. Green-backed Goldfinch. We did not see this species although Willett found it fairly common, April 25, 1912.

Passerculus sandwichensis alaudinus. Western Savannah Sparrow. Kaeding noted a small flock, March 10, 1897.

Passerculus beldingi. Belding Marsh Sparrow. Kaeding found this species breeding, with fresh eggs March 10, 1897. We found young and old birds very common. After long search, I found two nests. One, on the ground, held two half-grown young and one infertile egg. The other, about fourteen inches up in a small bush, had been visited by mice and contained neither eggs nor young.

Passerculus rostratus rostratus. Large-billed Marsh Sparrow. Howell reports seeing one or two.

Zonotrichia leucophrys gambeli. Intermediate Sparrow. This sparrow was found to be common in March and April, by Kaeding, Howell and Willett.

Aimophila ruficeps, subspecies? Rufous-crowned Sparrow. The rufous-crowned sparrow has been recorded only by Kaeding. We found it common on South Island and noted it also on North Island. Many were seen on the southern island feeding young which had left their nests but recently. On May 26 a bird flew up from my feet. Search revealed a nest built of dry grass in a slight depression in the ground under a bunch of dry grass. It contained four eggs in which incubation was moderately advanced.

Melospiza melodia, subspecies? Song Sparrow. One specimen secured by Howell was destroyed by rats before its subspecific identity was determined.

Pipilo crissalis senicula. Anthony Brown Towhee. We did not see this towhee, which has been recorded only by Kaeding.

Passerina amoena. Lazuli Bunting. One was seen by Willett, April 25, 1912.

Hirundo erythrogaster. Barn Swallow. Howell noted a colony near some caves along the shore, probably at the same point, on the southeastern part of South Island, where we saw a few pairs.

Vermivora celata sordida. Dusky Warbler. This is a common breeding bird on South Island, where many were seen feeding young. Two empty nests were found in bunches of lichen two or three feet up in small bushes. Kaeding's record of *V. celata lutescens* may relate to this subspecies. Howell secured a set of four fresh eggs.

Dendroica auduboni auduboni. Audubon Warbler. Kaeding notes that several were seen March 10, 1897.

Salpinctes obsoletus obsoletus. Rock Wren. Howell reported two nesting pairs. We saw the bird only once, near the center of the island.

Catherpes mexicanus punctulatus. Dotted Canyon Wren. Kaeding heard several singing on March 10.

Hylocichla guttata nanus. Dwarf Hermit Thrush. Kaeding reported this bird not uncommon, March 10, 1897.

Planesticus migratorius propinquus. Western Robin. Recorded by Kaeding as common, March 10, 1897.

Sialia mexicana occidentalis. Western Bluebird. Howell noted a pair, April 19, 1910.

San Francisco, September 18, 1923.

FROM FIELD AND STUDY

The Gray Jay at Lake Tahoe.—On August 17, 1923, my wife and myself while studying birds at Glenbrook, Nevada, on the eastern shore of Lake Tahoe, had an excellent view of a Gray Jay (*Perisoreus obscurus griseus*). We were on an elevated point some three hundred feet above the Lake, or at about 6500 feet above sea-level. The jay was perched on top of a large pine tree and we observed him there at rest for more than ten minutes.—HENRY E. PARMENTER, Santa Barbara, California, November 10, 1923.

The Nesting Places of Two Albatrosses in the South Seas.—The Museum of Vertebrate Zoology has recently had a gift from Captain John Bollons, New Zealand Government Marine Service, of a number of eggs of Australasian sea birds.

Captain Bollons, who is well known in New Zealand as a practical ornithologist and careful observer, in transmitting these eggs points out some of the breeding differences between the albatross peculiar to the New Zealand seas, the Royal (*Diomedea regia*), and the Wandering Albatross (*Diomedea exulans*). On the eastern side of Adams Island, one of the Auckland Group, 300 miles south of New Zealand, only *D. regia* nests. Four miles away on the same island, but to the southwest, only the nests of *D. exulans* are to be found. On Adams Island the latter bird nests four or five weeks earlier than *regia*. On Antipodes Island are found only the nests and eggs of *exulans*, none of the Royal. On the other hand, Campbell Island is the chief nidification ground for many *regia*; only a few nests of *exulans* have been found there. The eggs of the two species resemble one another; those of *D. regia* are, however, the larger.—CASEY A. WOOD, Chicago, Illinois, December 8, 1923.

An Intelligent Crow.—The following incident showing good power of adapting means to accomplish a desired end, as exhibited by a captive Northwestern Crow (*Corvus caurinus*), was related to me by Miss Adelaide King, of the U. S. Biological Survey, at Portland, Oregon. It is hereby presented in Miss King's own words.

"While passing through the City Park in Portland, Oregon, one afternoon recently, I saw a crow in one of the bird enclosures trying to pry a peanut out of a crack in a bamboo perch on which he was sitting. This bamboo perch had a rather large crack in it, and a peanut that had been thrown into the cage had lodged there. The crow worked with his bill for quite a time, unsuccessfully. He then stopped and looked on the floor of his cage. Observing a small stick he picked this up and flew back on the perch and worked on the peanut with the stick. With this he was able to push the peanut along the crack, but not to get it out. When he had pushed the peanut quite near the edge of the cage, he hopped around to the other side and pushed in the other direction. He finally succeeded, with the little stick in his bill, in prying the nut onto the floor of his cage, where he jumped down and got it."—STANLEY G. JEWETT, Portland, Oregon, October 18, 1923.

Late Occurrence of the Broad-tailed Hummingbird in Colorado.—During an early snowstorm on October 24, 1923, a female Broad-tailed Hummingbird (*Selasphorus platycercus*) flew into an open window in one of the rooms of the University of Colorado Museum, at Boulder, where it was taken by the writer.

This is a later date than any heretofore recorded from Colorado. Sclater in his *Birds of Colorado* says of this species: "It departs again in September, the males leaving some little time before the females and young birds. It was seen as late as October 15 by Robert Rockwell in Mesa County."

I have seen no reference to the occurrence of this species in the northern portion of the state later than September, although it is very common throughout the summer, and several pairs nested in Boulder last summer.—EARL THERON ENGLE, Department of Biology, University of Colorado, Boulder, Colorado, November 3, 1923.

Are the Feet of the Western Gull Ever Yellow?—Allan Brooks (Condor, vol. 24, p. 94) inquires as to the color of the feet of the Western Gull. He quotes Ridgway as saying that they are "yellow (in life)" (Birds of North and Middle America, Part

viii, p. 610). There seems to be a contradiction in the latter work, for on page 582 in the key to the genus *Larus* I find "legs and feet flesh color in life . . . *Larus occidentalis*." Either this is a contradiction or else the Western Gull has been found with feet both colors.

When Ridgway's Bulletin appeared, in 1919, I noticed the statement first quoted above and, not daring to dispute it, set out to find a Western Gull with yellow feet. My field of observation did not cover much territory, being mostly from the Alameda Pier to the Ferry Building at San Francisco, but I have made daily round trips between these two points, and during the winter months and many days in summer two round trips daily, making a total of about 575 round trips or 1150 single trips in a year. There were 365 of these trips made at night which leaves a total of 785 daylight trips a year looking for a yellow-footed Western Gull. I have counted from 50 to 300 birds of this species on a trip for nearly four years and while it is certain that I saw the same birds again and again, it is safe to assume that I have seen a good many thousand individuals and I have yet to find a Western Gull with yellow feet. All had flesh-colored feet.—F. N. BASSETT, *Alameda, California, January 11, 1924.*

The Subspecific Status of the Hermit Thrushes Breeding in the Humboldt Bay District.—It has long been known that some form of *Hylocichla guttata* breeds, though sparingly, in parts of the densely vegetated humid coast belt of Humboldt County, California. For instance, W. K. Fisher (Condor, III, 1901, p. 91) includes the species (under the name *aonalschkae* then current) as among the distinctly boreal types of birds found by him there.

Apparently the first specimens of breeding Hermit Thrushes to be examined from Humboldt County critically are the two recorded by J. Mailliard (Condor, XXIII, 1921, p. 165) from Myers' Ranch, on the South Fork of the Eel River, under the name *Hylocichla guttata slevini*. These two specimens (nos. 23975-76, coll. Calif. Acad. Sci.), taken in Douglas firs, are before me as I write these paragraphs, and I agree with Mailliard as to their determination, though they are not quite as small as *slevini* from the coast counties south of Mendocino County.

In the latter part of July, 1923, I did some field work in the vicinity of Carlotta, Humboldt County, with headquarters at the hospitable home of Mr. and Mrs. H. E. Wilder. Penetration of the dense redwood forest on the benches within two miles north of Carlotta quickly disclosed to me the presence of Hermit Thrushes there. Their wonderful songs swelled and waned among the otherwise dead-silent groves. The birds must have been fairly common, for on several occasions I was within hearing of two of them from one listening point. But, owing to the twilight dimness beneath the close-growing and lofty redwoods, intensified by the continuous high fogs, it proved a difficult matter to obtain specimens. While singing mainly from perches overhead, the birds did most of their foraging on the ground, over which they moved intermittently and with no commotion. The ground which they were searching was so shaded that there was scarcely a green thing to relieve the dominant brownness of the view, and in the gloom nothing at all could be seen of them until or unless they hopped up above the near horizon line from some uphill point of observation.

On July 20, I obtained two adult males (now nos. 43986-87, Mus. Vert. Zool.). These prove distinctly different from *slevini*, as also from *sequoiensis* of the Sierras. They are darker toned and larger than *slevini*, darker toned and smaller than *sequoiensis*. Furthermore, they cannot be referred to *nanus*, as might have been predicted on fairly reasonable argument, for their darkness of tone does not lead towards the warm brown of *nanus*. The astonishing thing is that, after much comparing, I am forced to call them *Hylocichla guttata guttata*. In other words, I am unable to find differences between them and birds from southwestern Alaska. Exact duplicates are to be found among this Museum's series of Hermit Thrushes from the Prince William Sound region (see Grinnell, Univ. Calif. Publ. Zool., vol. 5, 1910, p. 417). Of course, this is another case where with no probable immediate genetic affinities, representations of a variable species in two separated breeding areas have come to have, incidentally, identical characters. In the present instance, the Sitkan race *nanus* occupies territory intervening between the two areas, remote from one another, occupied by *guttata*. The Humboldt Bay district *guttata* might be interpreted as an intergrade between *nanus* and *slevini*, I suppose, though it may be remarked that breeding Hermit Thrushes seem to be rare or altogether wanting in the humid coast belt between Humboldt County and the Queen Charlotte Islands, British Columbia.

On July 25, 1923, I shot a pair of Hermit Thrushes in eastern Humboldt County, at the forks of the Van Duzen River, 8 miles east of Bridgeport and many more miles east of the eastern limits of the redwood growth. The birds were among Douglas firs in a north-facing shaded ravine. Even so, the light-intensity to my senses was far greater there than it was in the redwood forest where I had gotten the other thrushes five days previously. These upper Van Duzen River thrushes (nos. 43988-89, Mus. Vert. Zool.) are, like Mailliard's Eel River examples, *slevini*, showing the racial characters of small size and pale coloration. This pallor consists in not only less deeply and dully brown upper surface but in paler toned and more restricted dusky spotting on chest and in paler shading along sides. This distributional state of affairs with regard to the race *slevini* was rather to be expected from the fact that this subspecies had already been recorded from two points not far east of the Humboldt County line by Miss Louise Kellogg (Univ. Calif. Publ. Zool., vol. 12, 1916, p. 388).

The point that should come out clearly from the above statements is that the breeding Hermit Thrushes of the dense redwood forests near the seacoast in Humboldt County are subspecifically different from those of places farther inland in the same and other counties and in the coast counties to the southward. The subspecies of the Humboldt redwoods is by appearance to be referred to *Hyalocichla guttata guttata*, even though separated from the metropolis of that race by the intervening *H. g. nanus*.—J. GRINNELL, Museum of Vertebrate Zoology, University of California, Berkeley, October 22, 1923.

Notes from Southern and Lower California.—*Sula brewsteri*. Brewster Booby. A female specimen of this species was recently presented to the Natural History Museum, San Diego, by Dr. Van Wort, who collected the bird on August 7, one mile off the east shore of East San Benito Island, Lower California, Mexico. This constitutes the northernmost record of the species on the west coast of the Peninsula.

Lophodytes cucullatus. Hooded Merganser. Records of this bird from San Diego County are few and the following occurrence may be of interest. An adult female was collected by Charles Gordon at Warner's Hot Springs, November 15, 1922, and is now mounted in the Museum.

Archibuteo lagopus sancti-johannis. Rough-legged Hawk. On January 26, 1921, a male specimen of this species was collected by the writer at the Fanita Ranch, three miles west of Santee, San Diego County. On November 15, 1922, a Rough-legged Hawk was collected near the road in the eastern arm of Warner's Valley, San Diego County. Upon preparing the specimen the crop and stomach were found to contain an adult female pocket gopher (*Thomomys*) and six grasshoppers, recently captured. The after parts of the gopher, from the thorax back, with the six grasshoppers were found in the stomach, while the head and shoulders of the gopher remained in the crop. The victim had apparently been torn in two and swallowed in two gulps. Both hawks are in the collection of Laurence M. Huey.

Near the southern end of Warner's Valley, at the junction of the Palomar Road, another Rough-legged Hawk was seen on November 15, 1922, perched in the top of a dead tree. I pursued the bird, but was unsuccessful in approaching, as there was not sufficient cover for concealment. The bird flushed at about a hundred yards and the following excerpt from my notebook gives a description of the flight: "On taking wing the hawk gave a wonderful exhibition of flight, standing still high in the air, with quivering pinions, like a boy's kite, for minutes at a time; then, swooping toward the ground at some imaginary prey, it would ascend again for a minute or so to peer about."

A Rough-legged Hawk was observed and positively identified near Santee on December 24, 1922, by a party composed of C. G. Abbott, A. W. Anthony and the writer. This individual was recorded in Bird-Lore's Twenty-third Christmas Census. Otherwise this species has not before been recorded south of Ventura County.

Archibuteo ferrugineus. Ferruginous Rough-leg. Recent records of this species visiting southern California seem lacking, so the following occurrences in San Diego County seem worthy of note. A male taken by the writer at Jamacha, December 27, 1917. In the Huey Collection. A specimen taken by John R. Burnham, one mile north of Warner's Hot Springs, November 27, 1921. In collection of Natural History Museum, San Diego. A specimen taken by S. C. Sandford, in Viejas Valley, January 4, 1923. In collection of Natural History Museum, San Diego. An individual

observed by the writer in Warner's Valley, November 15, 1922. An individual observed by the writer (in company with C. G. Abbott and A. W. Anthony) one mile west of Santee on December 24, 1922, and recorded in Bird-Lore's Twenty-third Christmas Census. An individual observed by C. G. Abbott and Ralph Hoffmann near Campo, December 30, 1922.

This bird is a regular winter visitant to the San Jacinto plains region in Riverside County, but only occasionally straggles into the southern part of San Diego County.

Phalaenoptilus nuttalli nitidus. Frosted Poor-will. Returning late from a day's collecting in the back country on February 19, 1922, I collected two specimens of Poor-will in Mission Valley, near San Diego, by aid of automobile lights. One of them proved to be *P. n. californicus*, and the other was submitted to Mr. H. S. Swarth who pronounced it to be of the above subspecies. It was an adult female and constitutes the most western record for this bird. The specimen is now no. 2314, Huey Collection.

Junco oreganus shufeldti. Shufeldt Junco. A specimen of this Junco was collected on February 17, 1918, at Sloan's Ranch, five miles east of Dehesa, San Diego County. The bird was taken from a small flock of Juncos feeding along the creek and selected for its gray appearance. The sexual organs were so disfigured by shot that the sex was indeterminate, though the bird's bright black plumage would indicate it to be a male. This is the most southwesterly occurrence of this bird in California. The specimen is no. 1747, Huey Collection. Identification of the specimen was by Joseph Grinnell, H. S. Swarth and Major Allan Brooks.

Oreoscoptes montanus. Sage Thrasher. Dates of occurrence of this species from San Diego and vicinity seem lacking and the following data may be of interest. One specimen taken January 23, 1918, from the writer's back yard in the city. Huey Collection. Three specimens taken January 28, 1921, three miles east of National City. Huey collection. Four specimens taken March 15, 1923, five miles east of National City. Collection of Natural History Museum, San Diego. "Sage Thrashers were abundant on the mesa, and a great many could have been collected." Huey notes, March 15, 1923. This seems to mark an apparent regularity of the species each winter in this locality.—LAURENCE M. HUEY, *Natural History Museum, San Diego, California, September 29, 1923*.

Notes from the Vicinity of Santa Barbara.—On February 3, 1923, I noticed several Cassin Purple Finches (*Carpodacus cassinii*) feeding in weed patches under the trees in a walnut grove in Carpinteria. From that date till April 8, there were always from eight to twenty birds in the neighborhood of my house. Much of the time they fed with California Purple Finches and Willow Goldfinches in the sycamores; and once I found them feeding in live oaks. They were for the most part silent, giving only the characteristic three-syllabled call; but on April 3, one or two males sang. They were quite tame and rather more sluggish than either of the other two *Carpodaci*. On February 22 I found a number in Mr. Peyton's apricot orchard in Fillmore, showing that there had been something of a general invasion of the region west of their breeding range.

On September 13, 1923, I noted two immature Eastern Kingbirds (*Tyrannus tyrannus*) in the Bird Refuge at Santa Barbara. Several other observers reported that the birds spent several days in the same locality.

On October 25, 1923, at about dusk a Hermit Thrush was tugging at a worm on my lawn. A California Shrike (*Lanius ludovicianus gambeli*) dove from some trees about thirty feet away, landed in the spot hastily vacated by the thrush, and devoured the worm. In this procedure the Shrike showed the proclivities of a jaeger.—RALPH HOFFMANN, *Carpinteria, California, October 29, 1923*.

Another Flight of Harris Hawks.—Mr. Frank Richmond of El Centro, California, reports to me that on August 28, 1923, he saw near Calexico, a flight of about 250 Harris Hawks (*Parabuteo unicinctus harrisi*). He got within 60 feet of the nearest of them; apparently they did not have any fear of him or his auto. Some were perched in small trees and some in the cottonwood trees directly over his head, and others were hopping around on the bare ground. They were probably feeding, for the ground had just been irrigated and was quite wet. This is within two miles of the place where Mr. Richmond reported the flight on October 22, 1920 (see CONDOR, XXIII, 1921, p. 65).—W. LEE CHAMBERS, *Eagle Rock, Los Angeles, October 16, 1923*.

Some Arizona Notes.—During the winter and spring of 1922, I was able to gratify a life-long desire to visit the great Southwest. After a month spent in exploring the coast of Texas from East Galveston Bay to Brownsville, we reached Tucson on February 24, and spent something over nine weeks in Arizona, principally in the southern part. We had a bungalow for headquarters, at Tucson, elevation about 2500 feet, and a permanent camp at Oracle, forty miles north of there and about 4500 feet up, in the northern foothills of the Santa Catalina Mountains. Later, we spent three days at the Grand Canyon of the Colorado.

This was not exactly a collecting trip, for I was accompanied by my wife and two of my sons, neither of them particularly interested in birds; but they were keen to see the sights and explore the deserts, and the canyons of the wonderful mountain ranges, which we were all seeing for the first time. With the help of one of Mr. Ford's buzz-wagons and sundry cow ponies, we covered a lot of country, and I was able to do considerable collecting about Tucson, along the Santa Cruz and San Pedro rivers, and in the Santa Catalina, Tucson, Baboquivari and Canelo mountains, at elevations varying from that of the desert, 2500 feet, to that of the forest clad mountain tops, from 7000 to 9000 feet.

Always I had for reference Harry S. Swarth's admirable "Distributional List of the Birds of Arizona," and the following notes as compared with the statements in that publication, may be of interest to the readers of THE CONDOR.

Ruddy Duck. *Erismatura jamaicensis*. Mr. Swarth writes that "It very probably remains through the winter in southern Arizona, though there are no records of its doing so." On March 15 I saw six or seven Ruddy Ducks swimming about in one of the reservoirs on Mr. J. W. Ronstadt's Santa Margarita ranch, on the mesa just east of the southern end of the Baboquivari range.

Long-billed Curlew. *Numenius americanus*. According to Mr. Swarth, there are four records of this bird in Arizona. On April 11, two young men, whose addresses I have unfortunately forgotten, but who were boarding at a nearby inn, reported seeing a couple of what must have been Long-billed Curlew, about a tank in a sheep pen about four miles from Oracle. They described the birds very accurately, and upon my making a rough sketch of the Curlew, felt absolutely sure of the identification. Of course this is a sight record, but personally I have no doubt of its correctness.

Western Mourning Dove. *Zenaidura macroura marginella*. On April 22, on the mesa southwest of the Baboquivari Mountains, I collected a partial albino Mourning Dove from among the thousands that were feeding there. The bird was a male, with plumage badly worn, with its primaries and secondaries widely edged and tipped with creamy white, and with the feathers on the rest of its wings, shoulders and back splashed or tipped with the same color.

Arizona Woodpecker. *Dryobates arizonae*. Swarth speaks of this bird as a "common resident." "Reported from the Santa Rita, Chiricahua, Huachuca, Whetstone and Rincon mountains, and the east slope of the Santa Catalina Mountains." I am glad to report that I found this woodpecker a little farther north; it was common at from 5500 to 6000 feet in the Cañada del Oro, at the northern end of the Santa Catalinas.

White Mountains Fox Sparrow. *Passerella iliaca canescens*. On March 8, while collecting along a live oak clad "wash" just back of our camp at Oracle, I came upon one of those combination flocks of sparrows, among the bordering underbrush, including Western Chipping and Gambel, and a number, perhaps a dozen or so, of Fox Sparrows of some sort. As I had already collected my daily quota of birds to skin, and had no idea that Fox Sparrows were particularly rare in Arizona, I did not collect any at that time.

About an hour later, however, after I had returned to camp and had my lunch, I consulted Swarth's "List," and discovered that the Slate-colored Fox Sparrow (*Passerella iliaca schistacea*) was the only race recorded from Arizona, and that one as "a rare migrant and winter visitant." After hurrying back to the aforesaid "wash," and combing it carefully for several hours, I was able to find and collect but one bird, which proved to be a female. Mr. Swarth to whom I later submitted it for identification, writes me that "it is *P. i. canescens*. This is nearly like *schistacea* but is grayer colored throughout. It is a new bird for Arizona."

Bohemian Waxwing. *Bombycilla garrula*. According to Mr. Swarth, "On January 10, 1861, Dr. J. G. Cooper shot one of the birds at Fort Mojave, Arizona,

the first known instance of occurrence in the United States west of the Rocky Mountains and for many years the southernmost point at which the species had been found."*

Again, "On December 18, 1919," Mr. Swarth writes, he, "together with Mrs. Swarth, was fortunate in making a second observation. We [they] had just arrived at the Grand Canyon and were walking toward the brink for our first view of the famous gorge, when a whirr of wings and a subdued hissing close overhead drew our excited attention to a flock of Waxwings. The view was forgotten temporarily—the Cañon would stay there, the birds probably would not; there were fifteen of them in the top of a little juniper, bolting mistletoe berries so eagerly as to ignore all else, and we watched them at a distance of but a few feet, the nearest almost within arm's reach."

On May 9, 1922, I had been wandering along the rim of the Grand Canyon, admiring its indescribable grandeur in a violent snowstorm, and was coming back for lunch, when I discovered four beautiful and very tame Bohemian Waxwings feeding upon cedar berries on a tree in front of the Hotel El Tovar, and close beside the canyon rim. I had never seen these birds before, alive, and they allowed me to come right up under them so that I could have caught them with a landing net, had I had one with me. Their notes, which first attracted my attention, seemed to me a little louder and more musical than those of the Cedar Bird.

As it appears that I saw these Waxwings at exactly the same spot where Mr. Swarth saw them in December, 1919, one cannot help wondering how often these birds really do occur there.

Cedar Waxwing. *Bombycilla cedrorum*. On the morning of April 9, I saw a flock of seven Cedar Birds among the live oaks in a "wash" just back of my camp at Oracle, at an elevation of about 4500 feet. Later in the day a flock of about 25 birds flew over my camp. On April 19, while collecting on the ranch of Mr. T. M. Peters, near the northeasterly end of Baboquivari Mountains, I came upon a flock of seven or eight birds among the oaks in the bottom of a deep canyon at an elevation of about 4000 feet. These birds are, according to Mr. Swarth, "of rare and irregular occurrence."

Western Mockingbird. *Mimus polyglottos leucopterus*. Swarth says that this bird is "permanently resident in the hot valleys of southern Arizona, but there is a vertical migration downwards from the foothill regions where it occurs in summer; and possibly an entire departure from northern Arizona during the winter months."

Perhaps this bird, like the Mockingbird of the East, is harder than has been generally supposed, for while the winter of 1921-22 was, I am told, one of the severest on record in Arizona, I found this bird to be wintering at Oracle, 4500 feet, at the northeast end of the Baboquivari Mountains at about 4000 feet, and in the foothills of the Canelo Mountains, west of the Huachucas, at an elevation of 5000 feet.—FREDERIC H. KENNARD, *Newton Centre, Massachusetts, November 15, 1923.*

Golden Plover on the Southern California Coast.—On October 4, 1923, about 11 A. M., at Playa del Rey lagoon, Los Angeles County, the mud flats were alive with shore birds which we were studying with high power binoculars (we recorded 12 species), when our attention was called to a particular bird by Mr. H. N. Henderson of Whittier, one of our party of 26 Audubonites. We gradually moved to within one hundred feet (some of us to within 75 feet) of the bird, which was feeding from a mass of seaweed (kelp) with Least Sandpipers probing around it.

At a glance we recognized it as a plover; but one we had never seen before. We had just been studying the Black-bellied nearer the end of the flats, and afterwards studied the two in comparison with one another. We are familiar with the Black-bellied in all its varying plumages. The stranger was a smaller bird, with shorter bill (dark), and with other distinctive field identification marks. It had a wide whitish band above the eye, dusky brown near the ear region, and dusky sides and breast. It bobbed its head frequently when not engrossed in feeding. It stretched its wing and leg several times, showing whitish shafts to tips of outer flight feathers (no other white) and flecks of gold and white specks on black tail coverts. Its legs were a decided bluish-grey.

*The Bohemian Waxwing: A Cosmopolite, by Harry S. Swarth, University of California Chronicle, October 21, 1922, pp. 450-455.

We studied the bird individually, earnestly and conscientiously with our binoculars for fully twenty minutes before we compared notes, each one being timid to be the first to state his conclusion. All finally agreed in pronouncing it the American Golden Plover (*Charadrius dominicus dominicus*).—MRS. F. T. BICKNELL, Los Angeles, November 3, 1923.

Additional Records of Alpine Birds in Oregon.—Gray-crowned Rosy Finch (*Leucosticte tephrocotis tephrocotis*).—Although considerable ornithological investigation has been carried on in that part of the Blue Mountains of northeastern Oregon known as the Wallawas, it was not until July of the present year that Rosy Finches were known to occur in that region during the breeding season. While investigating coyote depredations on the Jay Dobbin's sheep range at the head of Big Sheep Creek in the Wallowa National Forest, at an altitude of approximately 8000 feet, my attention was drawn to a number of Rosy Finches feeding on the ground near the base of a high cliff. Several of these were seen to fly back and forth from the feeding ground to clefts in the cliffs where they were evidently feeding their young. The next day, July 23, 1923, specimens were secured and forwarded to the U. S. Biological Survey. These proved the subspecific determination, as above. The females showed every evidence of being incubating birds, and both sexes were in much worn plumage. On July 24, 1923, a small bird just out of the nest was seen. These notes constitute what is thought to be the first breeding record of this species in Oregon.

Black Rosy Finch (*Leucosticte atrata*). Among the many birds noted on the feeding ground at the base of the cliff on July 23, 1923, was a nearly black individual that proved to be a Black Rosy Finch. Upon dissection it was found that the testes were not enlarged as in the *tephrocotis* specimens.

Until further investigating is carried on in that section, it will remain a mystery whether this individual was merely a straggler from the nearest known breeding range in the Salmon River Mountains of Idaho, or an actual breeding bird. However, its presence in these mountains constitutes the first record of the occurrence of *Leucosticte atrata* in the State of Oregon.

Pipit (*Anthus rubescens*). On July 24, 1923, while crossing an open alpine meadow at 7500 feet elevation near Aneroid Lake, Wallowa National Forest, Oregon, I heard the song of a Pipit. The meadow was overgrazed by bands of sheep and the smallest object could be seen on the ground for a considerable distance. In a short time I saw a pair of these birds, and judging from their actions I was evidently close to either the nest or their young, as they showed much alarm at my presence. This constitutes the first record of the occurrence of this species during the breeding season in the State.—STANLEY G. JEWETT, Portland, Oregon, December 15, 1923.

EDITORIAL NOTES AND NEWS

Both Divisions of the Cooper Ornithological Club have unanimously elected to Honorary membership in the Club, Doctor Albert Kenrick Fisher. This distinction has been conferred upon Dr. Fisher in recognition of his contributions to western ornithology, the chief of which is his "Report on the Ornithology of the Death Valley Expedition of 1891," and also in recognition of his long service on the Biological Survey of the United States Department of Agriculture. Under the latter auspices Dr. Fisher has been largely responsible for the development of economic ornithology in the United States to its present high status. The Honorary membership list of the Cooper Club now contains eight names—Florence M. Bailey, Albert K.

Fisher, Henry W. Henshaw, C. Hart Merriam, G. Frean Morcom, Edward W. Nelson, Robert Ridgway and Frank Stephens.

The January, 1924, issue of *The Auk* presents as its "leader" what we consider by all odds the most valuable single article that has appeared in that journal for at least a year. This is Arthur A. Allen's "A Contribution to the Life History and Economic Status of the Screech Owl (*Otus asio*)". A precise standard of field observation is applied to a common species of bird with largely new results; and the data is handled inferentially in various interesting directions without resort to unsound logic or fatuous speculation. We would point to Dr. Allen's paper as an

admirable pattern to go by in outlining and carrying out life-history investigations.

We are glad to announce that Mr. Frank Stephens has rejoined the staff of the San Diego Natural History Museum, under the title Curator Emeritus of Vertebrates. Mr. Stephens was formerly director of that museum, but had subsequently turned his attention to the development of his ranch in eastern San Diego County. He will now be in a position to devote all his energies to building up the research collections in the institution with whose early history he had so much to do. Associated with Mr. Stephens is Mr. Laurence M. Huey as Curator of Vertebrates, Mr. Huey having received his training in this field under Mr. Donald R. Dickey of Pasadena.

In view of an evident tendency in our own State toward making the securing of collecting permits by beginning bird students more and more difficult, we feel it an appropriate time to quote the following authoritative statements in this regard, made by Dr. A. K. Fisher of the U. S. Biological Survey (in Bull. Amer. Game Protective Assoc., vol. 12, July, 1923, p. 9).

"In all branches of science, investigation and handling of material are essential to the development of our knowledge, and the more available the material, the more rapid the progress. Ornithology has advanced rapidly in the past for the reason that no lack of material has hampered its studies. Upon the data secured by students of this subject, all sane programs for game-bird conservation and all plans of game commissions have been founded. The more fully that definite knowledge gained by the work of ornithologists enters into the consideration of state game affairs, and the more interest that is shown in the subject by the commissioners, the more service will ornithologists render to the public and to game conservation."

"A few game commissioners who have had little or no scientific training have taken the position that a sufficient number of birds has been collected and no more specimens are necessary. If this principle were rigidly enforced, ornithology would soon be a science of the past, and game commissions would degenerate to mere political offices. Ornithology, like all other sciences, advances, and new facts are revealed, as the stu-

dent proceeds further and further with his subject. Conditions affecting the bird population are constantly changing, and these should be the subject of thorough, up-to-date investigations. If collecting birds had been stopped thirty years ago, there would have been no American Game Protective Association, no treaty for protecting birds migrating between the United States and Canada, and few waterfowl for the food and recreation of the sportsman."

"It is understood that much of the prejudice shown by commissioners toward ornithologists may have been inspired through the activities of maudlin sentimentalists or of those who have become satiated after years of sickening excesses. It has been stated that a reformed game butcher makes the most insistent advocate of the abolition of all shooting. It is believed that very much good would result to everyone concerned if the antagonism shown by game commissioners were changed to intelligent co-operation.

"The various game commissions continually need the assistance of ornithologists, and it is to be hoped that the prejudice that now seems so evident may pass away. Instead of discouraging the young ornithologist, the game commissions would do well to make it possible for him to secure material and to look upon him as an assistant and not as one whose chief object is the destruction of bird life."

The reproduction of the large number of photographs accompanying Mr. Dixon's article on the Wood Duck, in this issue, has been made possible through contributions toward the cost of engraving by three Cooper Club members whose names are, in deference to their personal preferences, withheld.

PUBLICATIONS REVIEWED

THE SECOND INSTALLMENT OF PHILLIPS' DUCK BOOK.*—Upon opening this volume, the very first feature of it that struck me was that the author puts every one of the 49 included species of ducks under the one genus name *Anas*. *Mareca*,

* A Natural History of | the Ducks | by | John C. Phillips | Associate Curator of Birds in the Museum | of Comparative Zoology at Harvard College | with plates in color and in black and white | from drawings by | Frank W. Benson, Allan Brooks | Louis Agassiz Fuertes | and | Henrik Grönvold | Volume II | The Genus *Anas* | [vignette] | Boston and New York | Houghton Mifflin Company | The Riverside Press, Cambridge | 1923 [November] ; 4to, pp. xii+409, 26 pls., 38 maps.

Querquedula, *Dafila* and *Nettion* are all quashed in favor of the older, inclusive, name *Anas*. This logical ruling, made in the most important ornithological work of the year, will, I sincerely hope, "impress" the A. O. U. Committee on Nomenclature with the real trend of scholarly feeling against generic splitting. Popular feeling in the same direction has already registered abundantly.

The next feature of Volume II, in comparison with Volume I (for general appraisal, see review in CONDOR, XXV, 1923, page 74), is the plethora of illustrations. There are 26 plates, mostly in color, besides 38 maps. While the color plates in Volume I were nearly all from the work of Fuertes, nearly all the plates in Volume II are from the brush of Allan Brooks; and, to date, these comprise the most worthy single offering from the last-named illustrator. The "wash" drawings, showing the nuptial behavior of several species of ducks, demonstrate Brooks' ability to observe happenings in nature with discernment of innumerable details.

From the standpoint of nomenclature, again, we note that the name of the Mallard goes back to *Anas boschas*; this is certainly far easier to write than *platyrhynchos*! The "Southern" Blue-winged Teal (*Querquedula discors albimucha*) falls as a synonym of *Anas discors*. But the lately described New Mexican Duck is recognized, under the name *Anas diazi novimexicana*. Incidentally (page 58), a specimen of this duck is recorded from Grafton [Yolo County], California, constituting an addition to the state list of California birds.

Referring to California further: the specimen of *Anas rubripes* recorded some years ago from Willows, Glenn County, it is suggested (page 72), may have been an escape from captivity. This possibility, even probability, of which I informed Dr. Phillips, presented itself when I learned that Black Ducks had been reared regularly on certain gun club grounds in west-central California. Another species, formerly ascribed to California, but which will now need to be put on our hypothetical list, is *Anas crecca*. I agree with Dr. Phillips (p. 217) that the two old California records "require further proof"—and this is not likely to be forthcoming.

As in the case of the first volume of "the duck book," the reader finds on almost every page comments of general interest—expressions of the author's matured views in various matters. For ex-

ample: "The word *courtship* has an anthropomorphic sound, and seems to imply a conscious and previously planned series of events, but it should not be considered in this sense when applied to behavior in animals. It would perhaps be better to invent an entirely new word to cover the long series of events which result from the 'mating hunger' of animals in general" (p. 30).

With this installment of Phillips' book, the undertaking is half done; that is, as regards publication, and this must mean that a good deal more than half of the vast work of assembling and assorting the basic data for the whole thing is done,—which inference is surely gratifying all around, to author and to expectant reader, alike.—J. GRINNELL, *Museum of Vertebrate Zoology, University of California, December 16, 1923.*

WALKER ON SOARING FLIGHT.*—This paper is of considerable interest to students of flight, as it is written primarily as a criticism of the unusual views advanced by E. H. Hankin in his volume entitled "Animal Flight" (London, Iliffe), and in various articles published elsewhere. Hankin's not very hopeful conclusion, from a great mass of data on the soaring flight of Indian kites and vultures, is that the phenomenon is shrouded in complete mystery. Walker, whose observations cover the same territory and are for that reason the more valuable, finds in air currents a sufficient explanation of this type of flight.

In the early morning, in the vicinity of Agra, atmospheric conditions as affected by temperature are extremely stable up to a height of 1 kilometer, and moderately stable between 1 and 2 kilometers. In the afternoon, however, there may be a difference of 22° C. between the temperature of the ground surface and that of the atmosphere 1.2 meters above, and the temperature may drop further 17° up to an altitude of 1 km. This causes conditions of great instability, creating currents which are sufficiently powerful in April and May "to reverse the direction of the ground winds over the whole region represented by Bareilly, Lucknow and Benares."

Over rocky or sandy soil, aviators report an "upward bump" to a height of several thousand feet, and a "downward bump" on passing over green vegetation

* Meteorology and the non-flapping flight of tropical birds, by Gilbert T. Walker. Proceedings of the Cambridge Philosophical Society, vol. 21, pp. 363-375.

or water. "At Simla within $1\frac{1}{2}$ hours of (after?) sunrise currents of 6 to 10 feet a second are common at heights of only 20 feet above tree-clad slopes facing the sun." At Agra a rather crude recording instrument, set on a tower 45 feet above the ground, on sunny days "indicated ascending currents beginning shortly before the upward gliding of birds and ending shortly after this had ceased."

It is stated that the "alula" type of wing has been successfully introduced in airplane design, its tendency being to reduce the angle of descent in gliding. This point, in the opinion of the reviewer, the author has insufficiently developed.

Contrary to some theorists, a steady horizontal wind is as useless in gliding as a perfect calm. But winds are constantly changing in velocity and direction. Calculations are introduced to show that the requisite energy for soaring may be derived from successive gusts of wind. This is regarded as a sufficient explanation of what Hankin calls "wind soarability" in the absence of sunshine. Also Rayleigh's theory of energy derived from a progressively increasing wind velocity with gain of altitude may occasionally suffice to explain gliding; at least it is a "useful auxiliary." In the case of gulls circling about the stern of a steamer, calculations are introduced to show that the differential wind velocity astern affords an adequate source of energy for this type of gliding.

In general, however, ascending currents are regarded as the source of energy of soaring flight. The author states: "During the past 7 years I have not seen a bird gliding upwards in a region where, from physical causes, descending currents could be expected; and in most cases ascending air has been strongly indicated."

The paper is concluded with a review of certain inaccuracies and discrepancies in Hankin's work, from the point of view of physics and mechanics, and mention of certain items of observation in which Walker cannot concur.

Most students of flight have felt that Hankin took insufficient account of known physical laws in arriving at his conclusions, and will appreciate this timely criticism, which is at the same time a contribution to our knowledge of soaring flight, clearly and concisely expressed. One lapse occurs on page 372, where the fact that kites and vultures

have difficulty in gliding at low altitudes is invoked as evidence that the ascending currents are stronger at higher altitudes, although the latter has previously been postulated in explanation of soaring.—ROBERT C. MILLER, *Department of Zoology, University of California, January 3, 1924.*

HANKIN ON THE FLIGHT OF GULLS.*—

By an odd coincidence, in the same number of the journal containing the above mentioned criticisms of his work appears another paper by Hankin in which further startling conclusions are set forth. When a steamer is under way, it is stated, some gulls may glide in the ascending currents to windward, while others soar in a "soarable area" to leeward of the stern. In the windward ascending current gain of height is gradual, with the axis of the body horizontal. But in the soarable area to leeward of stern the case is said to be very different. The gain of height is rapid, steep upward glides of 50 or more degrees occurring, "commonly to the level of the top of the stern flag-staff."

Gulls in the soarable area are further characterized by the appearance of a faint color on the wings. "The underside of the wing of a soaring bird often shows a power of reflecting color which power is usually absent when the bird is gliding with loss of height or in an ascending current of air."

But most surprising of all, the soarable area was found to be in the region of a descending current of air, as demonstrated by trailing strings astern, throwing grass overboard, and observing the behavior of smoke from the funnels. *Ascending currents were avoided.* If a gull happened to get into an ascending current, it was forced to flap until it regained the descending current, when it could again soar easily. The author also observed gulls soaring "in the probable position of descending gusts of wind" to the leeward of Gibraltar and Aden. In the latter case it was noticed that the wings of the gulls showed a bluish tint; but three minutes later, when the birds were gliding in an ascending current, the undersides of their wings appeared white. "Thus the evidence goes to show that near sea-level, as a

* Soaring flight of gulls following a steamer, by E. H. Hankin. Proceedings of the Cambridge Philosophical Society, vol. 21, pp. 426-429.

rule, gulls can only soar in a descending current of air."

While one hesitates to negative another's statements of observation, Hankin's findings in this, as in other cases, are certainly at variance with those of most students of flight. Apart from the admission that gulls sometimes glide in the ascending current to windward of a steamer, there is scarcely a statement in this paper in which the reviewer can concur. It is unfortunate that the details given are so few as to preclude the possibility of a reinterpretation of the data. Specific statements as to wind and weather are lacking. The position and extent of the soarable area under varying conditions are only vaguely indicated. "The level of the top of the stern flagstaff" is a somewhat indefinite statement of altitude. It is not clear what occurred after the gulls had glided to this height, whether they remained there a minute, or five minutes, or immediately dropped astern to repeat the performance. So complex are the air currents in the wake of a steamer that such statements of observation have little value, except as they describe in detail the behavior of individual birds under the most carefully analyzed conditions.

As regards changes of color, if any, during flight, these would appear to be of aesthetic or optical rather than aeronautic interest. But it is decidedly important to determine whether ascending or descending currents are utilized in soaring. No explanation is hazarded as to why the descending current should be preferred. Apparently the object of this paper is to support the author's previously expressed belief that soaring flight is a "complete mystery." The reviewer, who has elsewhere committed himself to the cause of those who find in ascending currents of air a sufficient explanation of soaring, will require further evidence to the contrary before reversing his opinion.—ROBERT C. MILLER, *Department of Zoology, University of California, January 3, 1924.*

CHAPIN'S GUIDE TO "THE PREPARATION OF BIRDS FOR STUDY."—Not in a long time has there come to my attention so useful a manual as the present one dealing with the preparation of bird skins. The author, Mr. James P. Chapin, is well-known as a pains-taking and otherwise successful field ornithologist, by reason

particularly of his several years' work in Africa for the American Museum of Natural History. In the present contribution Mr. Chapin brings together the results of his own experience and, doubtless also, that of his several practiced associates on the staff of that long-established institution.

An especially helpful feature of this guide is the abundance of illustrations. These leave practically no step in the procedure of bird-skinning which is not clearly and even artistically demonstrated. Just where certain cuts are to be made, stitches to be taken, and the tendons seized for removal from the tarsi, the location and appearance of the sex organs, and the nature of the "windows" in immature skulls, are among the points illustrated.

This is Guide Leaflet No. 58, issued by the American Museum of Natural History, and we note that it can be obtained from the Librarian of that Museum, Central Park, New York City, for fifteen cents—a merely nominal sum for a 45-page manual of such obvious value. Every field collector, no matter how well he thinks he knows his technique, will be sure to profit by studying it; and for beginners I can recommend nothing better.

Some points that Chapin makes and that appeal to me as especially worth heeding are as follows: Powdered arsenic (in mixture with alum in damp climates) is by all odds the best preservative, and, "with ordinary care" in its use, "it offers no danger to the health of the collector." Do *not* plug the nostrils of a freshly taken bird, for the pressure may change their form, which it is important to preserve. Do *not* use plaster of paris as an absorbent, as it leaves an undesirable "bloom" on dark-toned plumages. Tie the mandibles together so that the bill remains closed as it does in life; "a well-closed bill is essential to a good skin." Do *not* strip the secondary wing quills from the ulna; leave them attached to the bone, in normal order.

There is only one point in the whole thing that I would criticize adversely, namely, the implication that there should be a "collector's label" briefly inscribed, on a temporary tag, affixed to specimens in the field, in lieu of the regular museum label to be added later. This is a serious matter, and I would urge, rather, that a permanent label, made out *fully* (save for the scientific name of the species) *by the collector, in the field* at the time the specimen is prepared, be

attached to each and every specimen. A label to a scientific specimen is a voucher for facts, and these should be attested to by the full (business) signature of the collector, just as in the case of a commercial check. The insidious danger of error, in copying labels and in translating abbreviations, is too well known to museum workers to be discounted on any ground that I know of. The original label is the important thing.—J. GRINNELL, *Museum of Vertebrate Zoology, University of California, Berkeley, February 18, 1924.*

MINUTES OF COOPER CLUB MEETINGS

SOUTHERN DIVISION

NOVEMBER.—The regular meeting of the Southern Division, Cooper Ornithological Club, was held at the Los Angeles Museum, November 22, at 8 P. M., Mr. Pierce presiding, with twenty-five members and friends present. Minutes of the September meeting were read and approved. As the Club met in October with Friends of our Parks, no business meeting was held at that time. September and October minutes of the Northern Division were read.

The following names were proposed for membership: Cecil A. Poole, Monmouth, Oregon, by Stanley G. Jewett; Lloyd Peabody, St. Paul, Minn., by Rev. P. B. Peabody; Mrs. Florence V. V. Dickey, Pasadena, by Donald R. Dickey; William Remsen Varick, Santa Barbara, by Henry E. Parmenter.

Mr. J. E. Law called attention to a resolution which was adopted October 21, 1922, by the Executive Committee of the American Association for the advancement of Science. He moved that a like resolution have the unqualified support of the Southern Division of the Cooper Ornithological Club. After being duly seconded, the Club moved its unanimous approval of the resolution which follows:

Whereas, by repeated action by Congress for more than half a century, widely approved by scientific and other societies and by the public generally, the National Parks of the United States have been completely conserved from industrial uses so as to constitute a system of National Museums of Native America; and

Whereas, one of the national parks of Canada is similarly completely conserved; and

Whereas, the combined National Parks System of both countries, covering geological, biological and geographical examples from the Alaska Range, through the Canadian Rockies, to the Grand Canyon of Arizona, if preserved untouched will constitute a unique Continental Exposition of inestimable value to science and to the popular education of future generations; and

Whereas, at the option of a single official of

the Government, several of the national parks in the United States are nevertheless open to mining and grazing, while the control of water power in future parks has recently been surrendered to the Water Power Commission; and all but one of the national parks in Canada are similarly open to certain economic or commercial uses; and

Whereas, every interference with their natural condition will destroy the usefulness of these areas to science and education; and

Whereas, this generation can pass on to future generations no greater gift than these parks in their primitive condition; therefore,

Be it resolved, That the Cooper Ornithological Club earnestly requests the people and the Congress of the United States and the people and the Parliament of the Dominion of Canada to secure such amendments of existing law and the enactment of such new laws as will give to all units in the international parks system complete conservation alike, and will safeguard them against every industrial use either under private or public control at least until careful study shall justify the elimination of any part from park classification.

Miss Pratt exhibited a set of six leaflets, descriptive of Pacific Coast birds, published by the National Association of Audubon Societies. These leaflets have been written by west coast writers, and the illustrations, in colors, were by Major Brooks.

Miss Burnell called attention to the fact that Mr. Van Griffith is endeavoring to establish a bird sanctuary in Griffith Park at the head of Vermont Avenue, and that he hopes soon to secure an appropriation from the Park Commissioners for that purpose. She asked the Club's endorsement of the movement. A motion was made by Dr. Rich, seconded by Mr. Dickey, that the secretary be instructed to notify the proper authorities that the Southern Division of the Cooper Ornithological Club endorses the project for creating a wild bird sanctuary at the location mentioned. Motion carried.

Dr. Bishop read a communication from the New England Bird Banding Association, giving a list of birds banded by its members. Then followed a most interesting talk by Mr. Van Rossem on observations made by him during a recent trip in the High Sierras. Adjourned.—ELLA H. ELLIS, *Secretary pro tem.*

NORTHERN DIVISION

DECEMBER.—The regular meeting of the Northern Division of the Cooper Ornithological Club was held at the Museum of Vertebrate Zoology, December 27, 1923, at 8 P. M. President Cooper was in the chair, with attendance as follows: Members, Mesdames Allen, Bogle, Delpont, Grinnell, Kibbe, Mead, Schlesinger; Misses Beaman, Bennet, Burk, Clough, Thomson; Messrs. Bryant, Carriger, Clabaugh, Elmore, Evermann, J. Grinnell, W. Grinnell, Kibbe, Swarth, Wood. Mrs. Evermann was a visitor.

Minutes of the November meeting were read and approved. Mr. Henry Trost, of San Francisco, was proposed for membership by Mr. Joseph Mailliard, after which nominations of officers for the coming year were called for. Mr. Joseph Dixon was nominated for president by Mr. Carriger. A motion that nominations be closed was offered by Dr. Bryant and duly seconded. Carried. For Vice-president Mr. Lastreto was nominated by Dr. Evermann and nominations closed on motion of Dr. Grinnell. Mr. Kibbe presented the name of Mrs. Joseph Grinnell for the secretaryship and nominations were closed by vote of the club.

Dr. Casey A. Wood then entertained the club with an account of the birds of the Fiji Islands, illustrating his account with a large number of paintings of the species, native or introduced. After some discussion the club adjourned, having enjoyed a very pleasant and instructive talk on a subject unique in the annals of the club.—AMELIA S. ALLEN, *Secretary*.

JANUARY.—The regular meeting of the Cooper Ornithological Club, Northern Division, was held at the Museum of Vertebrate Zoology on January 24, 1924, at 8 p. m. President Cooper was in the chair and the following members were present: Misses Beaman, Bennet, Burk, Flinn, Flynn, Pringle, Thomson, Van Gaasbeek; Mesdames Allen, Bamford, Bogle, Delport, Davenport, Ferguson, Grinnell, Mead, Mexia, Schenck, Schlesinger, Roe; Messrs. Borell, Bryant, Bunker, Carriger, Chaney, Clabaugh, Cooper, Dawson, English, Evermann, Grinnell, Hunt, Labarthe, LaJeunesse, Lastreto, Mailliard, Miller, Moffitt, Morley, Simpson, Storer, Swarth, Wright. Visitors included: Miss Morrish and Mesdames Bryant, Storer, Swarth, Thomson, and two young gentlemen whose names were not secured but whose inclusion brought the number present up to fifty, an auspicious beginning for the new year.

The minutes of the December meeting were read and approved. A communication from the secretary of the Pacific Division of the American Association for the Advancement of Science was read, requesting that the Cooper Club send two delegates to meet with the Affiliations Committee at Mechanics Institute, San Francisco, on February 2, 1924, at 2:00 p. m., to discuss plans for the annual meetings to be held at Stanford Uni-

versity June 25 to 28, 1924. The chair appointed as delegates Dr. Evermann and Mr. Lastreto.

On motion of Mr. Grinnell, seconded by Mr. Mailliard the action of the Southern Division in electing Dr. A. K. Fisher to honorary membership was unanimously ratified.

The meeting then proceeded to the election of the officers nominated at the December meeting. On motion of Mr. Wright, seconded by Mr. Labarthe, Mr. Joseph Dixon was elected president. On motion of Mr. Storer the secretary was instructed to cast the ballot electing Mr. C. B. Lastreto as vice-president. On motion of Mr. Mailliard, seconded by Mr. Bryant, Mrs. Joseph Grinnell was elected as secretary.

The chairman introduced Mr. Swarth, who called attention to the untiring service which has been rendered to the Cooper Club by Mrs. J. T. Allen, secretary of the Northern Division during the past eight years, from January, 1916, to January, 1924. He remarked that doubtless Mrs. Allen would be surprised to learn that the Cooper Club had for once carried through a piece of business without either her knowledge or her help. He then presented to Mrs. Allen on behalf of the Northern Division a pair of high-grade six-power binoculars and two books: Dresser's Manual of Palearctic Birds, and Ramsay's Guide to the Birds of Europe and North Africa. He expressed the wish that they might prove useful to her during her contemplated year of bird-study in the Old World. Mrs. Allen thanked the Club warmly and promised to report, some nineteen months hence, upon her experiences.

According to custom, the new officers were seated, Vice-president Lastreto presiding in the absence of President Dixon. Dr. H. C. Bryant, speaker of the evening, gave an informative talk upon "Some Fallacies in Game Protection."

Mr. Clabaugh asked for information upon the Game Refuge Bill now pending in Congress, and the Chairman suggested that this subject be made a special order for discussion at the February meeting.

The evening closed with an exhibition by Mr. W. Leon Dawson of completed copies of "The Birds of California." Several different bindings were shown, all of them both beautiful and durable. Little time was available for an examination of the text, but all present were intrigued by the arts of the printer and the book-binder. Adjourned. — HILDA W. GRINNELL, *Secretary*.



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